THE AMERICAN NEPTUNE

A QUARTERLY JOURNAL OF MARITIME HISTORY

PUBLISHED BY THE AMERICAN NEPTUNE, INCORPORATED
SALEM, MASSACHUSETTS

$5.00 a year $1.25 a copy

Notes, pp. 148-150

Book Reviews, pp. 151-156

Advertisements, pp. 157-158

Entered as Second Class Matter, February 26, 1941, at the Post Office at Salem, Massachusetts, under the Act of March 3, 1879. Additional entry at the Post Office at Portland, Maine.

THE AMERICAN NEPTUNE

A QUARTERLY JOURNAL OF MARITIME HISTORY

Volume IX. No. 2

April 1949

Published by The American Neptune, Incorporated, Salem, Massachusetts

Printed by The Anthoensen Press, Portland, Maine

Collotype plates by The Meriden Gravure Company, Meriden, Connecticut

THE AMERICAN NEPTUNE

A Quarterly Journal  *of Maritime History*

VOLUME IX APRIL 1949 NUMBER 2

RESEARCH in American maritime history is often made difficult by the inaccessibility of adequate runs of the published registers of American shipping. While many of the older libraries have extensive collections of books and periodicals relating to shipbuilding and maritime trade, registers are relatively scarce, for they were in most instances considered to be practical tools for countinghouses and insurance offices rather than suitable material for libraries. Like telephone directories of the present day, they were apt to be discarded when a more recent issue arrived. Consequently the student is often hampered by his inability to find in one place a sufficient number of registers of consecutive years to trace the ownership of a given vessel.

In an effort to remedy this situation the Editors of THE AMERICAN NEPTUNE *hope to arrange for the photographing, on 35 mm. microfilm, of a selected group of American registers of shipping. The technical facilities of the Massachusetts Institute of Technology have been placed at their disposal for this purpose, and it is planned within the year to begin making master negatives of certain registers, from which positive microfilm copies could be made at reasonable cost for any libraries or individuals that wished to order them.*

The Peabody Museum of Salem has extensive runs of American Lloyds Registry of American and Foreign Shipping *published in the sixties and seventies by E. and G. W. Blunt, the* Record of American and Foreign Shipping, *established in 1867, and the* Bureau Veritas Registers, *as well as smaller holdings of the* New York Maritime Register, Merry's New York Weekly Maritime Reports, *and the* Boston Marine Reporter. *None of these files are, however, entirely complete, and the Editors would be glad to hear from any libraries or individuals who may have volumes in their possession that they would be willing to lend for microfilming, or who might wish to order positive microfilms to complete their own sets.*

In the first two volumes of the NEPTUNE, *articles on present-day craft and rigs of the Mediterranean by T. C. Gillmer, an officer of the United States Navy who had made good use of his service in European waters, were published. In the present issue, a detailed study of Arab dhows of eastern Arabia by Richard LeBaron Bowen, Jr., who took advantage of wartime service in Arabia to increase our knowledge of the sailing craft of that region, appears. Mr. Bowen is arranging for the reprinting of his article with the addition of a frontispiece, a preface, a critical discussion of the available literature, a collected bibliography, and an index. Copies of this reprint, in wrappers, may be ordered from him at 173 Columbus Avenue, Pawtucket, Rhode Island, for $2.75.*

Eastern Names

BY LINCOLN COLCORD

Reprinted by permission from *The New Republic* for 16 September 1916

WHAT'S in a name? If the heart has atrophied, having attained that wisdom which is mainly disillusion, a name is nothing much; but if the heart keep young, a name's the world and all. What man of parts, choosing a book at random, would hesitate between Paolo and Francesca and Peter Simple, or spend his money for *Martin Chuzzlewit* if his eye fell on *The Last of the Mohicans* or *The Master of Ballantrae* in the next row of the stall? And, of all right-spirited young sprouts of sensibility and good romantic proclivities, who would not rather love a girl named Eleanor than one named Mary Jane; who would not rather follow a commander named Nelson than one named Henry Simpkins; who would not rather go to sea in a ship named the *Talavera* than in one named the *Codfish;* who would not rather sight the land in the Straits of Sunda than at Brackett Bay?

Even though Tristan d'Acunha is a bleak and uninhabitable island, and though the full-rigged ship *Henry B. Hyde* was one of the swiftest and most beautiful vessels that ever spread a sail, yet the sailor's heart refutes the prose of knowledge, and still believes in delectable and sounding names. He dreams of capes and islands whose appellations are music and a song, of lands that echo their delightful syllables, of mountains that shout the grandeur of their crowned and stately realms; and if by any chance a ship were given him again, and he were told to sail in search of treasure and romance, he would lay his course for Eastern waters, where squalls hang in the shadow of Sumatra-side, where the North Watcher stands like a sentinel at the head of the Thousand Isles, where the land-breeze drops at evening from the Java hills.

The track towards the East is marked with singing names. No sooner is the voyage well under way, than Fernando de Noronha heaves in sight—that island of the tall black Pinnacle, a pencil of rock, a mighty spire above the mountain roof, known to every sailor who has crossed the Line in the Atlantic. It appears, rises, stands on the horizon pale and wonderfully

green in the shimmering tropic air, a jewel set on a still and silver sea. It vanishes astern, as the ship picks up the southeast trades.

In the height of the trades, another island, Trinidad (not Port of Spain) breaks the horizon, a dark lump of barren rock in the midst of sparkling waters, quickly passed in the hurry of the constant breeze. Soon afterwards the Cape of Good Hope stands abeam; the Cape of Good Hope, first called Cabo Tormentoso, Cape of Storms. Vasco de Gama, the Portuguese, first rounded it. And then the Indian Ocean, past Algoa Bay, Natal and Madagascar. And past the Keeling Islands, that bold piratical group, where blood and mutiny abound, and treasure caskets lie buried under burning sands.

The first big land sighted on the outward passage is at Java Head; beside it stands Cape Sangian Sira, with its name like a battle-cry. We are in the Straits of Sunda; name charged with the heady languor of the Orient, bringing to mind pictures of palm-fringed and native villages, of the dark-skinned men of Java clad in bright sarongs, clamoring from their black-painted dugouts, selling fruit and brilliant birds. These waters are rich in names that stir the blood, like Krakatoa, Gunong Delam, or Lambuan; or finer, more sounding than all the rest, Telok Betong and Rajah Bassa, a town and a mountain—Telok Betong at the head of Lampong Bay and Rajah Bassa, grand old bulwark on the Sumatran shore, the cradle of fierce and sudden squalls.

How shall we cross the China Sea—through Banka, Gaspar, or Caramata Straits? It all depends on the monsoon. In Banka, we are fairly launched among the smooth Malayan names. We pass the Lucipara Islands, we take a bearing on Tobo Ali Lama and the Karang Brom-Brom. But Gaspar is the main highway. How often have we picked up the light of Shoalwater Island, made the coast of Billiton, and passed close under Southwest Point, where the white light-house stands above the palms. Navigation in these channels was a constant menace to the old-time navigator. Many a vessel driving home on a clipper passage touched on a point of coral that showed no breakers and found herself wrecked beneath calm and tropic skies. She left her name along with her bones. Hippogriffe Shoal and Hillsborough Rock; Actaeon and Severn Reefs; and many more, each mark the grave of some fine ship. We think of them as we pass by. The waters of Caramata touch the shores of Borneo, inscrutable and lovely island of the East. We hail the town of Banjarmassin, and pass on.

Perhaps the two most beautiful names in all the East are given to the waters lying along the opposite coasts of Borneo—Palawan Passage, and

Macassar Strait. Palawan skirts the Borneo shore in the China Sea, running up between Palawan, Labuan, and the group of shoals to westward in open water, named mostly for ships or captains of the past. South of Palawan, Balbac Strait leads into the Sulu Sea; to the northward lies Mindoro Strait. The names along these coasts are divided between the English and the native tongues; Triple-Top Island, Treacherous Bay, Boat Rock, and Conflagration Hill alternate with such names as Appurawan, Bahelee, Inlulutoc, and Malampaya. Spanish names, too, begin to appear: Santa Monica is a town on the north of Palawan, and Punto de San Tomas, on the island of Mindanao, is the site of a remarkable Spanish ruin.

Along the coast of the Philippines, Spanish, English, and native names are equally divided. Beside the island of Popototan lies Isla Verde, and next to that, the Haycock. Off to the westward, we find another group of shoals and dangers named for clipper ships: Diana Reef, Elphinstone Rock, Rifleman Bank, Investigator Shoal. Out on the middle track, of the track of fair monsoons, lie the Anamba Islands, Amboyna, and Seluan. And farther still to the westward, in the Gulf of Siam, are many well-known names of fine romantic flavor: Saigon, Bangkok, Cambodia, Pulo Condore, and Cape Padaran.

But if the northeast monsoon is at its height, we would better turn aside from Sunda and the China Sea, and take the Eastern Passages to the Pacific. These waters have seen stirring times. Here, in days when great fleets of sailing ships traversed the eastern seas, when coasts were ceaselessly charted, the captains lived in constant fear of hidden dangers. Winds were baffling, tides confusing and strong; the channels were so narrow and tortuous that often it was a difficult operation to work a ship through without striking on the outlying shoals. Many a man has looked down through the clear waters of Macassar Strait or Ombay Pass, and seen the white coral rising to his keel when he thought he had twenty fathoms to spare. But on they drove, for tea and silk and spices, across the Flores Sea through Ombay Pass, across the Bania and Arafura Seas, up through Molucca Passage, past Amboina and the rich Spice Islands, out at last through the Straits of Jillolo to the open Pacific. Then northward and in by Bashee Channel, where in the fairway lies Botel Tobago, an island named for a boy's wildest dream.

And on to the ports of China, so familiar that we seldom try to remember how they used to sound. Hong Kong, Amoy, Canton, Foochow, Shanghai —these speak a secret language to the sailor, a tale of ardent adventure in the old clipper tea-trade, and bring to mind the long procession of ships

that have passed away. Romance. He likes to repeat the names that once were part of every day in port: Stonecutter's Island, Lymoon Pass, the Great Ladrones, and Kowloon-side. With joy in each syllable, he tells of Pratas Reef, and Pedro Blanco, and the Pescadores, which used to lead him in from sea. And he remembers, too, another place called Happy Valley, lying amid the palms and blossoms of Wanchi.

Arab Dhows of Eastern Arabia

BY RICHARD LeBARON BOWEN, JR.

with drawings[1] and photographs by the author

I

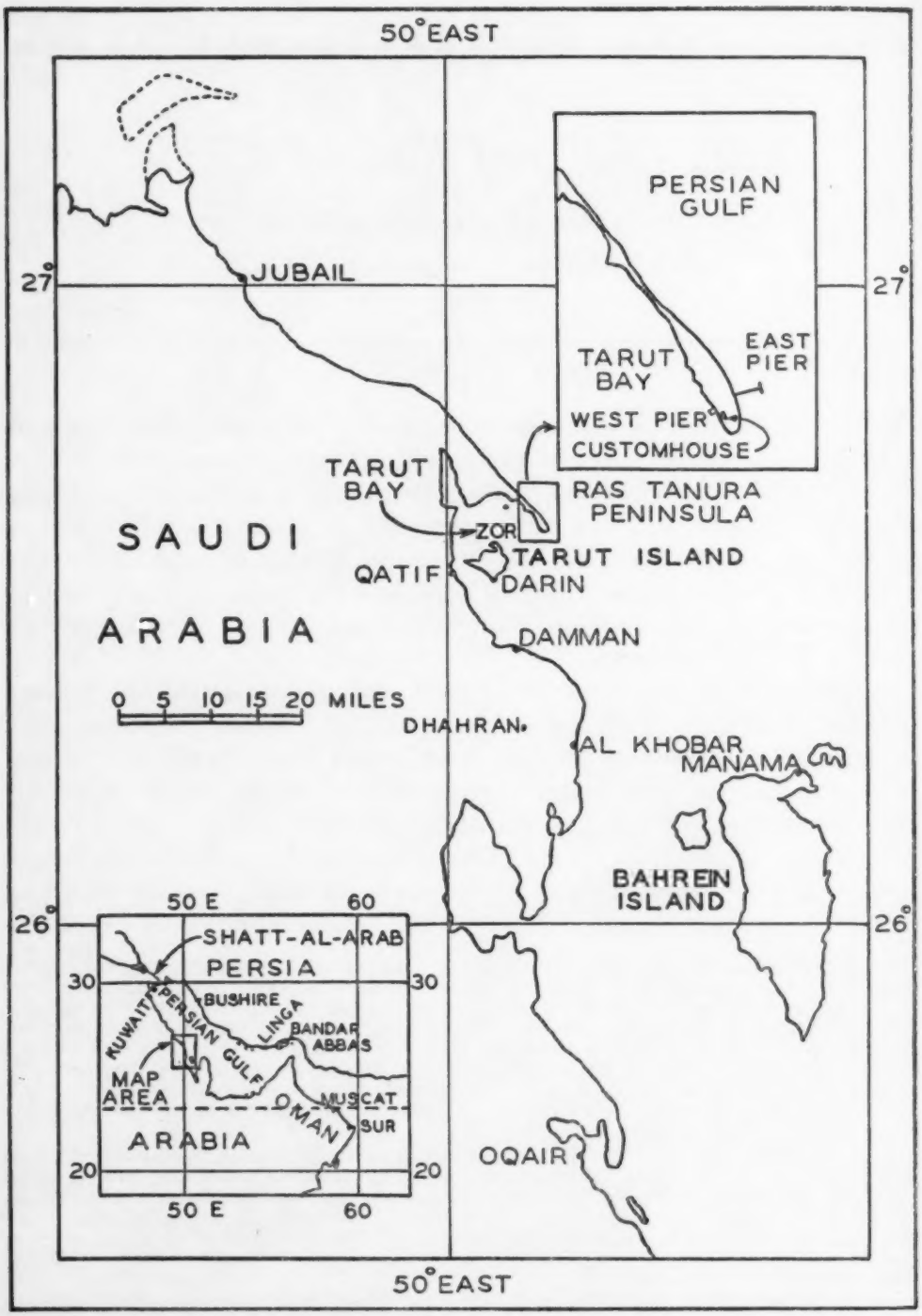
WATERCRAFT provided probably one of the oldest forms of all transportation; all early civilizations developed boats or rafts of various sorts, and many of them invented square-rigged sails hung from a yard and a mast for utilizing a wind which might be blowing in the direction in which they were traveling. It is not difficult to imagine early man perfecting a boat for sailing before the wind, for it is a natural cause and effect phenomenon; the wind blows, pushing whatever gets in front of it ahead, downwind.

There is a picture of a square-rigged Egyptian boat dating about 3100 B.C.[2] preserved for posterity on a piece of pottery (Figure 1).[3] These square-rigged craft were used on the Nile River for centuries as the only means of communication over long distances. Here their use was ideal, as the Nile River flows north to the Mediterranean while the prevailing winds come out of northerly quarters. Thus a boat could be floated or rowed down the river easily, and the prevailing wind could be relied upon to bring it back up the river (to the south). So convenient did the Egyptians

[1] The drawings of the typical dhow types were made from every photograph and sketch available in print and in private collections. Thus the sections shown are indicated, and not measured. The plan and sheer of the *jalbhut* and the *shewe* were taken from actual measurements by the author. The plan and sheer of the *sambuk* were taken from sketches by other authors. [A. Moore, 'Notes on Dhows,' *Mariner's Mirror*, XXVI (1940), 208-209; J. Hornell, *Water Transport* (Cambridge: University Press, 1946), p. 237.] Without the photographs of Alexander C. Brown, it would have been impossible to draw the sheer and sections of the *baghla*, as all other writers have shown only the stern view to illustrate the elaborate and ornate carving. All waterlines have been estimated with the vessels light.

[2] I am indebted to Mr. I. E. S. Edwards of the British Museum for this date and for the reference showing this craft. Every author writing on the subject of early sailing that I have read has given a different date for this earliest sailboat known to man, as well as distorting the original image of the craft. E. K. Chatterton, *Sailing Ships and Their Story* (Philadelphia: Lippincott Co., 1923), p. 22, gives 6000 B.C., R. C. and R. Anderson, *The Sailing Ship* (New York: McBride, 1947), p. 18, give 4000 B.C., and E. L. Bloomster, *Sailing and Small Craft* (Annapolis: U. S. Naval Institute, 1940), p. 63, gives 2000 B.C.

[3] H. Frankfort, 'Studies in Early Pottery of the Near East,' *Royal Anthropological Institute*, Occasional Papers, No. 6 (1924), plate XIII.



Location map of the eastern Arabian coast and Persian Gulf area discussed in the text

find this arrangement that there was probably little incentive to develop any higher type of sail; it remained for the people of the outside sea areas to develop a more advanced type.

The lateen-rigged sail, as used on boats from Gibraltar to the Malabar coast of India, is a logical development of the square-rigged sail. The lateen rig is a very simple arrangement, as shown in Figure 2; a quadri-

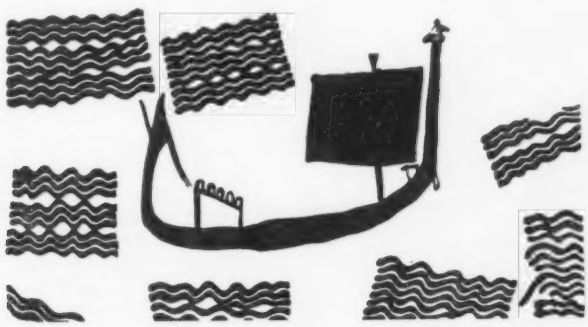


Fig. 1. Egyptian square-rigged vessel of *circa* 3100 B.C. shown on a piece of Egyptian pottery. This is the earliest record of a sailing craft known to man

lateral shaped sail (sometimes virtually triangular if the luff is short) is bent to a yard hung at its center from the masthead. The tack is hitched to the bowsprit with a tack purchase when sailing to windward and the mainsheet is belayed to the poop deck. The lateen rig, as shown in Figure 2, looks unbalanced with too much sail area forward. Anyone ambitious enough to calculate the center of effort of the sail and the center of lateral resistance of the hull of Figure 2 will find to his amazement that the craft is properly balanced.

Consider a square sail of the type the Egyptians used for millenniums on the Nile River; many of the illustrations of the Egyptian boats that have come down to us show a sail with a length about twice its height, hung high on the mast, usually with a boom on the foot. If we lift one edge of this sail it may be twisted around, so that, when sailing to windward it looks something like a lug-rigged sail, and may be pointed higher into the wind than a square sail. Between the third and fourth cataracts on the Nile River, there are to be seen to this day boats called 'nuggars'[4] (Figure 3), carrying a square sail that has simply been tilted to form a

[4] J. Hornell, 'Frameless Boats of the Middle Nile,' *Mariner's Mirror*, XXVI (1940), 125.

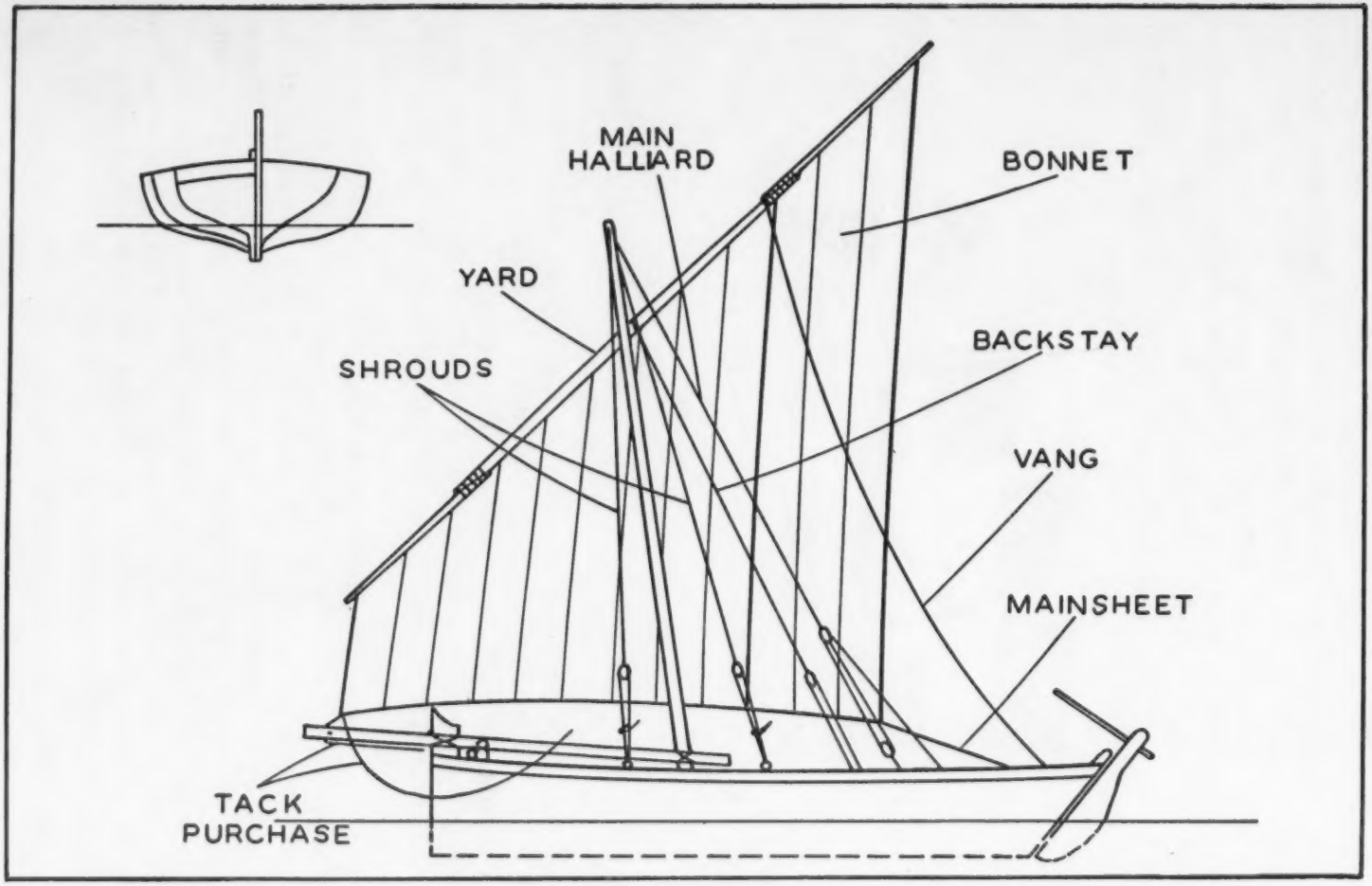


Fig. 2. Single-masted lateen-rigged Arab dhow. The craft is locally known as a *jalbhut* to the Arabs of the western Persian Gulf who sail it. The sail is typical of all Arab dhows. The *jalbhut* is characterized by its bolt-upright stem, its broad beam, and its shallow draft

crude lug rig, with a boom along the foot. The head of the sail is twice the length of the luff, just as the ancient Egyptian ones.

The evolution of this type of sail into a true lateen cannot be accomplished as easily as the transformation from a square sail into this crude lug sail. There are many who have looked at the nuggar, and immediately jumped to the conclusion that it was the intermediate step between the square sail and the lateen sail. To change the nuggar sail into a true lateen, the sail foot must be lowered so that it is parallel to the gunwale. A few Middle East lateen-rigged boats still carry a boom on the foot. The

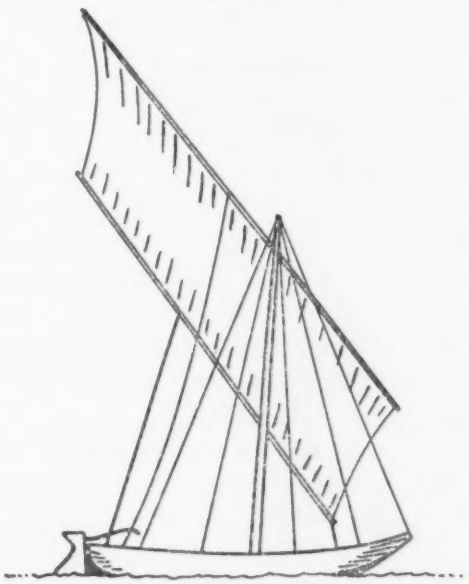


Fig. 3. The 'nuggar' of the Middle Nile. Its sail is the same shape as ancient Egyptian square sails, and has been simply tilted to form a crude lug sail

actual changes involved in going from the ancient Egyptian square sail to the nuggar sail involve no change in the shape of the sail, only a change in the rigging.

E. K. Chatterton[5] states that the lateen sail was adapted from the Egyptian square sail a few centuries before the introduction of Christianity, and he implies that the nuggar was the intermediate stage. There are several facts that do not bear this theory out. The Egyptians had used a square rig on the Nile for many thousands of years (at least from 3000 B.C.) without changing its general arrangement. After 1000 B.C. the power

[5] E. K. Chatterton, *Sailing Ships and Their Story* (Philadelphia: Lippincott Co., 1923), p. 14.

Persian Gulf who sail it. The sail is typical of all Arab dhows. The *jalbhut* is characterized by its bolt-upright stem, its broad beam, and its shallow draft

of the Egyptians was waning; about 1200 B.C., Rameses III, the last great king of Egypt, fought a sea battle, using galleys with a single square sail.[6] It seems rather presumptuous to ask the Egyptians to supply the inventive power to change their square rig, or crude lug rig, to a lateen rig, at a time when they were beginning to decay and crumble—especially after they had used the square rig successfully for well over 3000 years. In the third century B.C., Alexander defeated the Egyptians; after the Greeks came the Romans. If the Egyptians had developed the lateen sail before Alexander's conquest, it would seem logical that the Greeks, and the Romans after them, would have adopted a sail which would enable them to sail to windward. We have numerous pictures of Greek and Roman sailing ships preserved on coins and bas-reliefs, all of these showing vessels carrying square sails.

What about the nuggar? The nuggar was probably as far as the Egyptian square sail evolved on the Nile River, and has existed to this day as proof of the fact, for if it had evolved into a lateen rig, would not the lateener be found in its place? The fact that the nuggar is now found only between the third and fourth cataracts, which are physical barriers against the movement of craft as well as against the spread of ideas, shows that it has probably remained where it first evolved, unchanged since its evolution from the primitive square rig. This rig is probably the only direct descendant of the ancient Egyptian square rig.

If the lateen sail did not evolve on the Nile River, where did it evolve? The problem may be attacked by means more scientific than by guessing. Consider for a moment where the lateen rig is found; it predominates on the North African side of the Mediterranean Sea, up the Nile River for a considerable distance, in the Red Sea, down the east coast of Africa as far as Zanzibar, in the Persian Gulf, and as far east as the west coast of India. It is certainly more than a coincidence that this coastal area is predominantly Moslem!

The elements that started the original Moslem empire in 622 A.D. were fundamentally Arabian, from the interior of Arabia—devoid of any outstanding culture outside of their powerful religion. As the forces of Islam gradually spread west through North Africa and into Spain, and east through India and into the Far East, they adopted all of the best cultural developments of the conquered, and then assimilated and later redistributed this acquired culture as the culture of Islam. Somewhere among their conquests, the Moslems must have 'discovered' the lateen rig; as one

[6] E. Marx, 'The First Recorded Sea Battle,' *Mariner's Mirror*, XXXII (1946), 243.

of the cultural aspects of Islam, the lateen rig was later spread throughout the Moslem empire. The lateen sail must have been introduced into the Mediterranean by the Moslems as part of their culture; once introduced, it spread from one end to the other. There is a Greek manuscript showing single-masted lateen-rigged ships dated *circa* 885 A.D.;[7] only some three centuries before this there are records that the Romans were still using square sails,[8] and probably if we had complete records, the transition in the Mediterranean Sea would be seen to have taken place in a matter of decades.[9]

The lateen rig completely dominated the whole of the Mediterranean for almost a thousand years after its introduction. A Spanish manuscript of the thirteenth century shows a two-masted lateen-rigged vessel,[10] and French and Spanish manuscripts of as late as the eighteenth century show two- and three-masted lateen-rigged vessels that were then common on the Mediterranean,[11] all similar in certain points to the Arab lateen-rigged craft still used in the Persian Gulf and Red Sea. Even the Venetians, Genoese, and Pisans had adopted the lateen rig for their fighting galleys, many of which fought against the Moslems during the crusades.

There is little doubt that the lateen rig was discovered by the forces of Islam in their conquests and spread throughout their domains, but the question 'where?' is not too easily answered. In our consideration of the Nile River and the nuggar, we eliminated the Nile River, and thus the Mediterranean Sea, as the home of the lateen sail; therefore its birth must have been farther east. Considering the coastal areas where the lateen sail

[7] H. H. Brindley, 'Early Pictures of Lateen Sails,' *Mariner's Mirror,* XII (1926), 13.

[8] C. Torr, *Ancient Ships* (Cambridge: University Press, 1894), p. 139.

[9] Jules Sottas, 'An Early Lateen Sail in the Mediterranean,' *Mariner's Mirror,* XXV (1939), 229, 441, has attempted to show that the lateen sail existed in the Mediterranean as early as 533 A.D. simply because the historian Procopius, who accompanied a Byzantine expedition to Africa in 533, wrote that the admiral of the fleet 'gave an order that the three ships carrying the officers in chief command should have as much as a third of the upper angle of their sails painted red.' Sottas immediately infers from the word 'angle' that the three ships were lateen-rigged. A further passage of Procopius' work actually mentions triangular sails on the three ships.

It seems strange that the officers in command would sail on three lateen-rigged ships that certainly must have been new and strange to the officers as well as the crew. If the lateen rigs were so highly prized as to be used only by the command, it seems strange that the whole fleet was not lateen-rigged. It seems more logical to this writer that the triangular sails refer to triangular topsails, which were standard gear on Roman square-rigged ships after 50 A.D. and are depicted on documents and murals as late as 500 A.D. The famous Portus ship (shown in a Roman relief of *circa* 200 A.D.) showing a triangular topsail formed of two triangular pieces has been excellently illustrated by a model by J. Sottas, 'A Model of the Portus Ship,' *Mariner's Mirror,* XXI (1935), 145-152. The top angle of this triangular topsail is a logical area to paint to mark the command ships as it would be visible to all the other ships. If the command were in three lateen ships and the rest of the ships were square-rigged there would be no need for marking the ships as they would be distinctive by themselves. Thus the earliest authenticated record of lateen ships in the Mediterranean still seems to be *circa* 885 A.D.

[10] R. C. and R. Anderson, *The Sailing Ship* (New York: McBride, 1947), p. 105.

[11] Ibid., p. 106.

still exists, this would mean the Red Sea, the east coast of Africa, the Persian Gulf, or the west coast of India.

This defines a general working area; by other considerations we can limit ourselves further. For the development of anything as revolutionary as the lateen rig, our first prerequisite will quite naturally be a competent civilization. In the areas that we are considering, there were several capable civilizations: on the Red Sea, the Sabæans (people of the Queen of Sheba) had been thriving on the west coast of Arabia for almost a thousand years, from before 800 B.C.; on the Persian Gulf, the Persians were at their height after centuries of development. There were no groups of people, on either the west coast of India or on the east coast of Africa, who could be considered as possessing civilizations. Thus our picture narrows to the Red Sea and the Persian Gulf. It should be remembered that at this period there was no Suez Canal connecting the Mediterranean Sea with the Red Sea, so if a distinctive rig had developed in the Red Sea, it would not have been able to sail into the Mediterranean Sea.

History is full of the Sabæans and their great caravan routes. The Sabæans picked up goods shipped to southern Arabia from India, China, and the rest of the East, and transported them north to Egypt and Syria, thence they were again sent by ship to Europe. Certainly if the Sabæans had developed a lateen-rigged ship that could sail into the wind, they would have carried these goods north on the Red Sea by ship; but history tells us that they traveled by camels. Thus we turn to the Persian Gulf in our search for the home of the lateen sail.

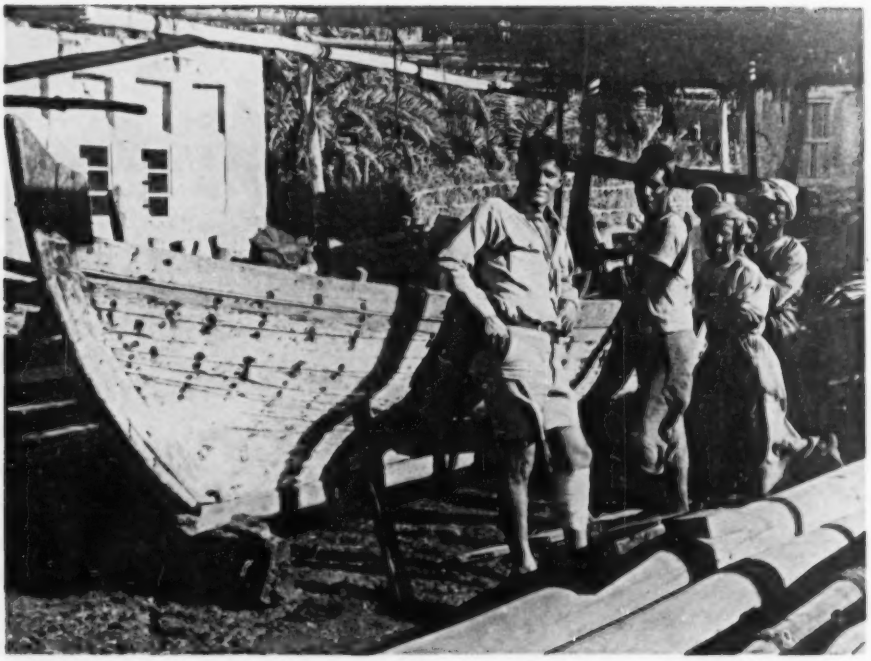
The capital of the newly formed Islamic state moved from Medina to Damascus less than a half a century after Islam was officially founded; sometime later the capital was moved to Bagdad. Much of the culture that the early Moslems acquired was Persian. Eventually the Arabs were themselves absorbed, and the Persians and descendants of the ancient Babylonians were found more and more in prominent places. Much of the great culture that centered in Bagdad was Persian; thus it seems logical that the forces of Islam derived the lateen rig from the Persians.

There is much circumstantial evidence to substantiate the claim that the Persians originated the lateen rig, as now exemplified by Arab sailing craft. Alan Villiers sailed with the Arabs for over a year on an ocean-going lateen-rigged ship built by the Arabs, and spent much time in the Persian Gulf Arab port of Kuwait. He states that tradition has it that the shipbuilders of Kuwait originally came from Persia, Bahrein, and Qatar,

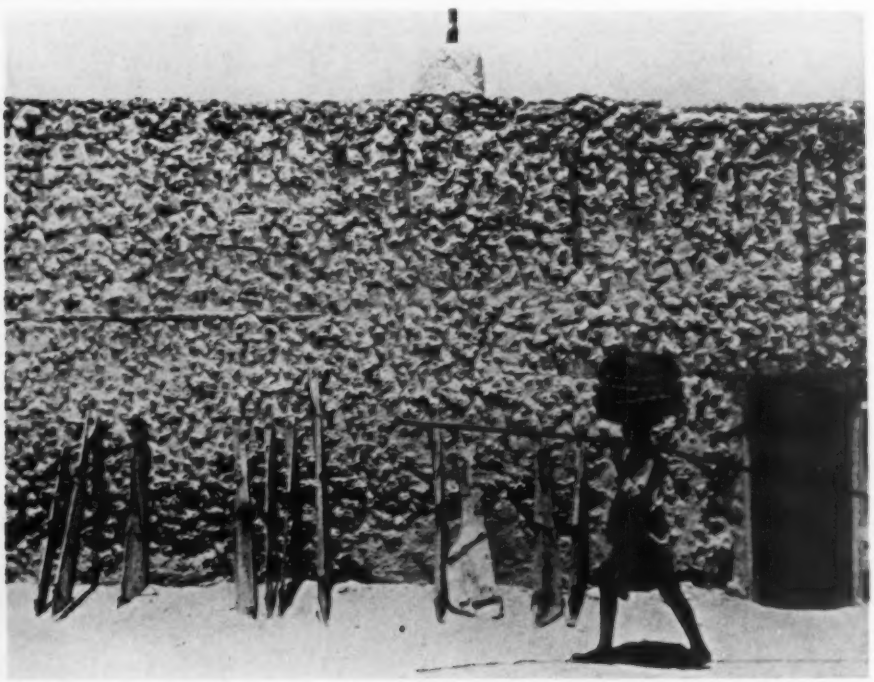
The *baghla* type of dhow sailing before the wind. Note the topsail hung from the temporary extension of the mainmast and the jiggermast

Reproduced from a photograph by Alexander Crosby Brown

Jalbhuts on the beach at Jubail. There are twenty odd *jalbhuts* in the picture and one small *ballam,* while another two dozen odd *jalbhuts* were in the foreground under and behind the camera. On the eastern Arabian coast and on Bahrein Island ninety-five percent of the coastal boats are *jalbhuts*



The author standing by a *shewe* being reconditioned in the Manama boat yards on Bahrein Island. The keel, the gunwales, and some ribs have been replaced. Note the stemhead which is finished with a reverse curve similar to the *sambuk* and the *jalbhut*



Dhow rudders at the police station at Zor on Tarut Island. An Arab leaves his rudder instead of his ship's documents with the port authorities, as in Arabia there are no documents

and that the shipwrights and shipmasters of Kuwait believe that the Persians sent sailing ships to Africa and India 3000 years ago.[12] It is probable that the Persians were carrying cargo for the Sabæans. Now Persia imports dhows from Kuwait and takes second place to Kuwait in deep-sea sailing trade.

In the sixth century, just about one hundred years before the Islamic movement had its birth, the Persians sent a naval expedition to the Yemen, at the request of the Yemenites, to repel invaders from Ethiopia. Thus in the sixth century the Persians had so mastered ship construction and ocean sailing that they could send a fleet far beyond the confines of the Persian Gulf. Originally the Arabs from the Arabian desert were skeptical of ships and the sea. The great Arab general Amr ibn al As, who was responsible for many of the early conquests in the first decade of Islam, advised Caliph Omar to refrain from ventures at sea and referred to the Mediterranean as 'a great pool, which some foolhardy people furrow, looking like ants on logs of wood.'

Other desert warriors were quick to realize the advantages that could arise from the use of sea power in their conquest and expansion, and two fleets were organized. A Mediterranean fleet built under Greek and Syrian guidance captured Cyprus in 649 A.D. The Arabs dispatched a powerful Asiatic naval expedition against Sind in vessels built and navigated under Persian guidance, and successfully established a naval base on the Sind coast in 712 A.D.[13] Most of the existing lateen-rigged boats of the present day are sailed by Arabs; but many of their nautical terms still reflect their Persian origin. The Arabic word for shipmaster, *nakhoda*, is of Persian derivation; it is also known that medieval Arab pilots used Sailing Directions compiled by the Persians.[14]

The evidence is strong in favor of the Persian origin of the lateen sail, and the impetus towards such a development is clear. In the Persian Gulf, the prevailing winds are northerly. The Persians could sail to Bahrein, the Arabian coast, and even out of the Gulf in a square rig of the type the Greeks, the Romans, and the Phoenicians used, but they could not sail back against the wind, and would have to wait for a change in the wind, either to east or west, to sail back up north.

It was undoubtedly the necessity to sail closer to the wind that provided the stimulus for the evolution of the lateen rig. A square sail of the type used in the Mediterranean in the first centuries of the Christian era

[12] A. Villiers, 'Dhow-Builders of Kuwait,' *Geographical Magazine*, XX (1948), 345-350.

[13] There are records of Arab naval raids on the Sind coast as early as 636 A.D.

[14] J. Hornell, *Water Transport* (Cambridge: University Press, 1946), p. 233.

could probably not come closer to the wind than seven points, whereas a well-designed lateen rig could come within four points of the wind (as can a fore-and-aft rig). Some of the full-rigged ships built in the nineteenth century could come within five and one-half points of the wind, with the aid of staysails and a fore-and-aft mizzen, and a modern yacht can come within three points; but these are super refinements of both rigs and need not bother us. It is probable that the lateen rig was evolved by the Persians through an intermediate stage such as the Nile River nuggar after sailors found that a lug-type sail would point closer.

II

'Dhow' is the collective English term for all the varied types of lateen-rigged craft, whether one- or two-masted, sailed by the Arabs in the general area of the Persian Gulf, the Red Sea, and the Arabian Sea. It is interesting to note that the Arabs refer to none of their craft as dhows; the Arabs use as a general term the word *markab,* which corresponds to our word 'boat' and is used to describe a small boat or a modern steel ocean-going freighter.[15] Most of the larger ocean-going so-called dhows are two-masted, while the smaller coastal boats are single-masted. Three-masted dhows are only occasionally seen (Plate 9). Some of the large ocean-going dhows have taken to carrying a jib, or more properly a flying jib. Dhows are built on the Arabian side of the Persian Gulf either at the great yards in the port of Kuwait at the head of the Gulf, or on Bahrein

[15] There seems to be some evidence that the word 'dhow' may have originated from a Swahili word for a craft native to Zanzibar waters, as E. Steere, *Handbook of the Swahili Language as Spoken at Zanzibar* (9th ed., London: Society for Promoting Christian Knowledge, 1913), p. 38, writing in 1870, lists under 'kinds of dhows' the '*dau,* pl. *madau,* a small open vessel sharp at the stern, with a square matting sail . . . [belonging] to the original inhabitants of Zanzibar.' It is easy to understand how the word came to be applied by English-speaking people as a general term for all Arab lateen-rigged craft. Zanzibar is the southern port for the vast number of lateen-rigged Arab and Indian craft that sail down from the north on the northeast monsoon, which starts in October every year. Starting in December ships from the Somali coast, the Red Sea, Muscat, the Persian Gulf, and India, pour into Zanzibar. The main cargo of the Persian Gulf and many Indian ships is dates, which fortunately ripen before the northeast monsoon sets in. The northward passage starts with the April southwest monsoon.

The northbound cargo in the time of the ancients was tortoise shell, ambergris, hippopotamus teeth, and slaves. In more recent times the main northbound cargo seems to have been slaves. In the nineteenth century the British started to combat the African slave traffic and established a base at Zanzibar, the main port of exit of slavers. Every type of lateen-rigged Arab craft was at Zanzibar at one time or another; it is thus not strange that the Swahili name of a common local type of Zanzibar craft should come to be applied as a general term for Arab lateen-rigged craft as a whole by the English while combating slavery. Captain Colomb of the Royal Navy, *Slave Catching in the Indian Ocean* (London: Longmans, Green, and Co., 1873), p. 35, after discussing several types of craft, states that: 'In the navy [these] are always called "dhows".' It is very probable that today we might know Arab lateen-rigged craft as 'markabs' rather than 'dhows,' *if* the monsoons did not blow in their amazing predictable manner, thus making it possible for Persian Gulf (and other) craft to sail over 3000 miles to East Africa with a fair wind, pick up a cargo of African slaves, and sail back to the Persian Gulf on the fair southwest monsoon. But then Arab ocean-going craft would not have developed to such an extent if it were not for the monsoons.

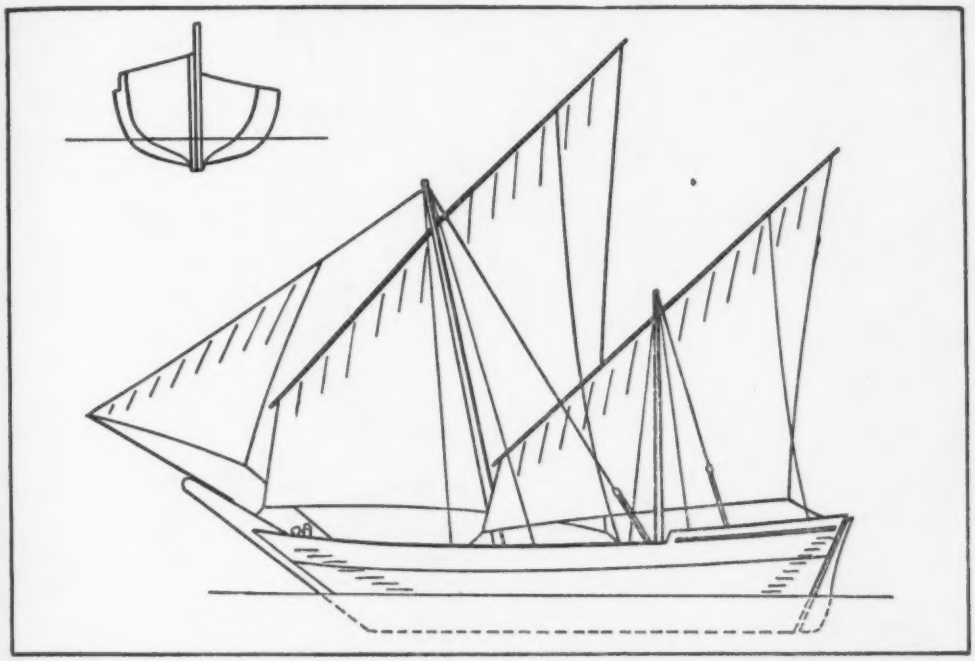


Fig. 4. The *bhum* is characterized by its plank-like bowsprit and its upright mizzenmast. It often carries a flying jib

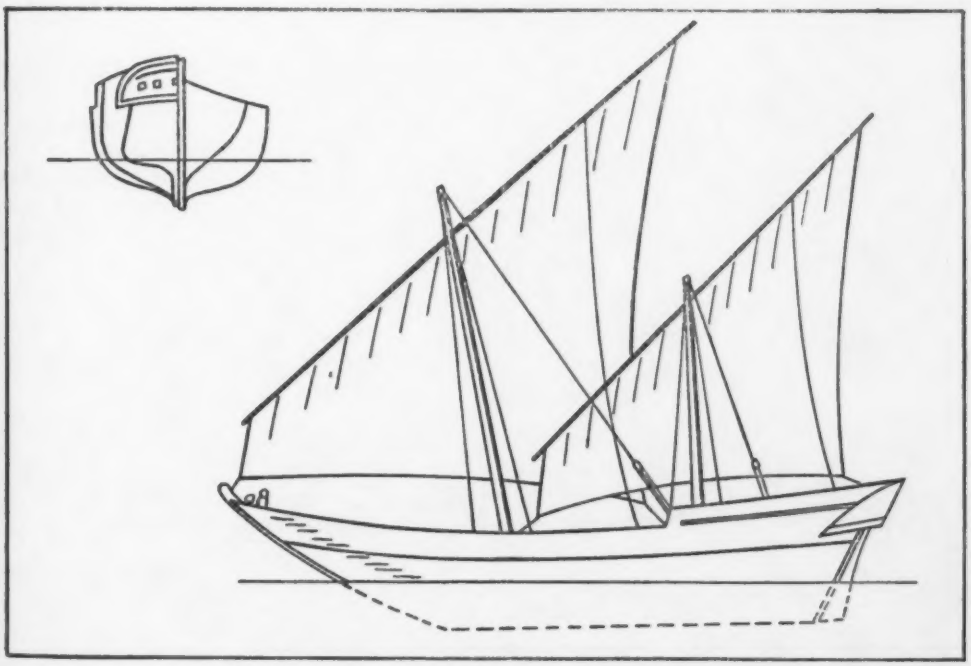


Fig. 5. The *baghla* is characterized by its highly carved transom stern, its quarter projections, its rounded cutwater, and its bollard-like stemhead

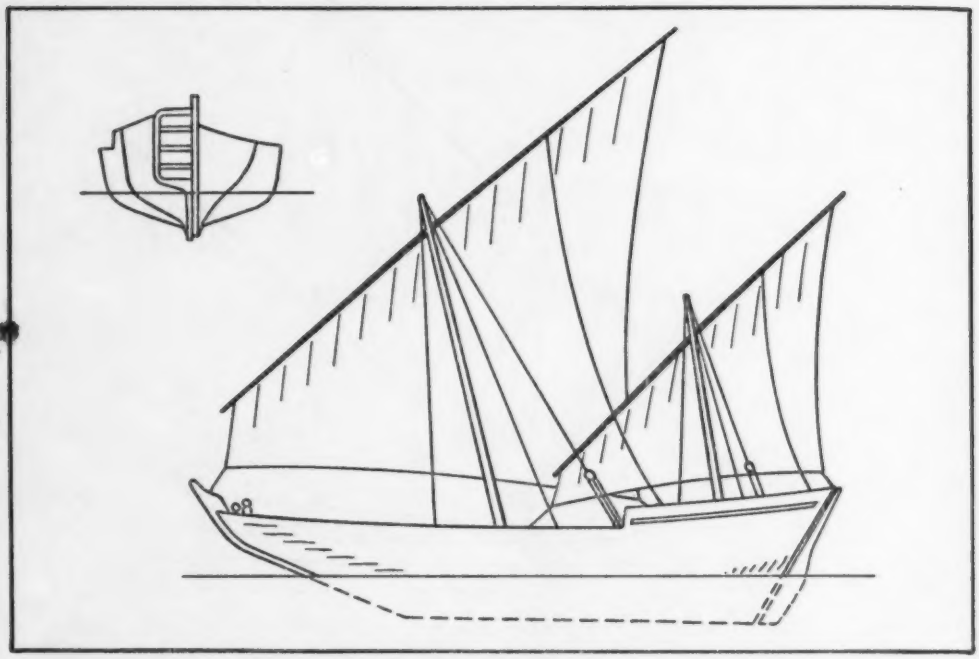


Fig. 6. The *sambuk* is characterized by the bend in its otherwise straight stem section. The stemhead terminates in a symbolic horn-like pattern

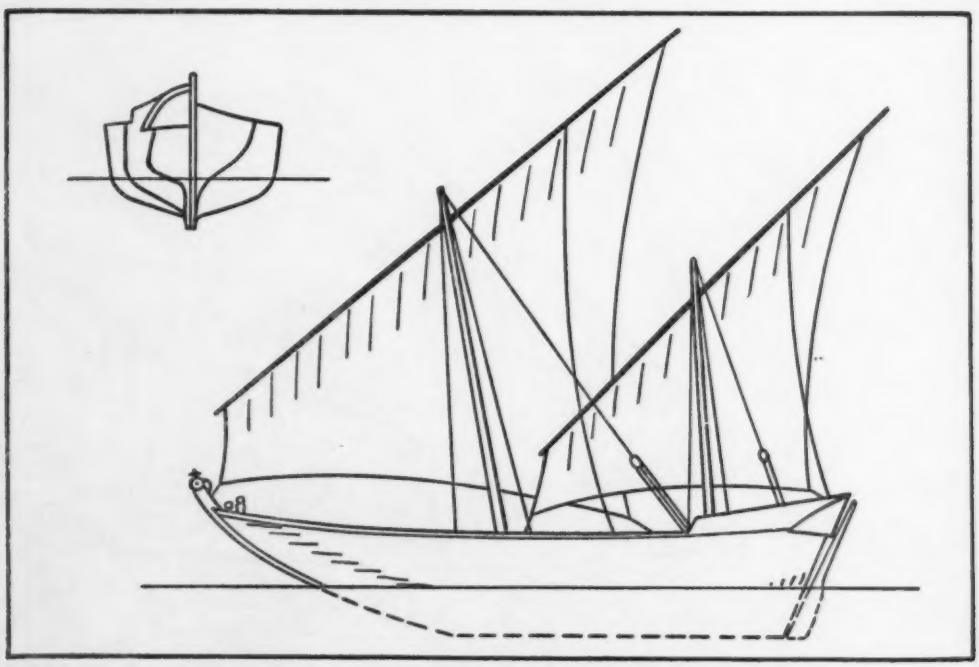


Fig. 7. The *ganja* is characterized by the unique ornamental figurehead, the vestigial quarter projections, the lack of carving, and the lack of counter

Island (where the shipyards are small compared to those of Kuwait); on the Persian side of the Persian Gulf they are built at Bushire, Linga, and Bundar Abbas.

The craft we call dhows are classified by the Arabs according to the design and construction of the *hull;* any type may be either one- or two-masted, depending on its size. The large ocean-going dhows average eighty to ninety feet, having an average displacement of 130 to 140 tons. These large dhows are of several types;[16] they may be differentiated either by their sterns or their bows, or by a combination of both. The *bhum* (pronounced 'boom') is double-ended, with a raked sternpost (Figure 4), while the *baghla,*[17] the *ganja,* and the *sambuk* have square raked transom sterns. The *sambuk* has a plain transom (Figure 6), while the transom of the stately *baghla* is beautifully carved and has quarter projections (Figure 5 and Plate 9), both in the manner of an eighteenth century line-of-battle ship, from which it was probably copied. The *bhum* has a distinctive built-up flat tapered plank-like bowsprit. The stem is a perfectly straight timber, set to the keel at such an angle that the bowsprit makes an angle of from 35° to 40° with the water as the stem continues up out of the water. So distinctive is the prow on a *bhum,* that a *bhum* may be identified from its bow even before one sees its double-ended stern (Figures 4 and 12). The *bhum* is known to English-speaking people as a 'Kuwait boat,' as the majority of *bhums* are built in Kuwait.

The *baghla* bow is distinguished from the *bhum* bow in that it has a low prow with a rounded cutwater; the stempost curves up gently. The *ganja* is usually Indian-made and identical with the Indian-sailed *kotia,* except for the stem, which is altered by the Arabs to form a distinctive ornamental figurehead (Figure 7). This craft has quarter projections similar to the *baghla,* but lacks the elaborate carving of the *baghla* on the stern.[18]

[16] Within the last century a formerly important type of Persian Gulf ocean-going dhow has become virtually extinct; this is the *batil.* Writing in 1870, Steere, op. cit., p. 38, describes the *batil* as 'a low vessel with a long projecting prow, a sharp stern, and high rudder-head. They have often a flying poop and a second mast. They belong to the piratical Arabs from the Persian Gulf.' A. Villiers, *Sons of Sinbad* (New York: Charles Scribner's Sons, 1940), p. 417, states that he 'saw only one, laid up on the Al Khobar beach . . . [*Batils*] were formerly much used in the Persian Gulf pearling and were favored by the pearling admirals.' Colomb, op. cit., p. 258, shows an engraving of one of these graceful craft under full sail being chased by a British gunboat. Freya Stark, *Bagdad Sketches* (London: John Murray, 1937), plate 17, shows pictures of the details of one at Kuwait.

[17] Arabic for 'she mule'—'mule' because of its cargo-carrying capacity, 'she' because it is a ship.

[18] Considerable confusion exists in the minds of virtually everyone regarding the exact differences between the *baghla,* the *kotia,* and the *ganja.* The *kotia* is simply an Indian-built *baghla,* and the *ganja* is ideally a *kotia* with its stemhead altered. The *kotia* stemhead is adorned with a conventionalized representation of a parrot's head. Because the Koran prohibits the representation of man or animal in ornamentation, Moslem purchasers of the *kotia* (whether Indian or Arab) alter its idol-like stemhead, so as not to offend the Prophet, by reducing the bird-like affix to a circular disk with a crest-like finial on top. The *baghla* stemhead consists of a bollard-shaped prolongation of the stempost, often encircled with grooves. Thus it is conceivable that in an ideal case a *baghla, kotia,*

The *sambuk* is like the *baghla* in general characteristics, lacking the scroll-embellished transom and the quarter projections, usually with less sheer aft, and is considerably smaller.

Most dhows, whether large or small, are built with a dead-level keel timber set parallel to the waterline. The stem and sternposts are carried up from the level keel, the type of craft depending upon the manner in which this is done. Exceptions to this seem to be the *sambuk* and the *baghla*. Although both of these craft still have straight keel timbers, the keel is not parallel to the waterline. The *sambuk* is constructed so that it draws more water aft, while the *baghla* is built so that it draws more water forward. This is much the reverse of American and European practice, wherein a boat usually draws more water aft. Therefore when a *baghla* is beached or taken up on the ways, she is brought in stern first so as to maintain a more or less level keel.

Bhums, ganjas, and *baghlas* are the common ocean-going craft of the Persian Gulf; the *sambuk,* that of the Red Sea. *Sambuks* are to be found occasionally in the Persian Gulf; *bhums, baghlas,* and *ganjas* are seldom seen in the Red Sea.[19] The *baghla* is relatively rare now, as the carving is very expensive and merely ornamental, serving no useful purpose. Villiers[20] states that there are probably not more than fifty of these beautiful craft left. The *baghla* was originally a chief product of Kuwait, but it has been displaced by the double-ended *bhum,* which is the pride of Kuwait now. *Baghlas* have not been made at Kuwait for over a quarter of a century, and when new *baghlas* are made they are made at Sur in Oman, but are inferior to those originally made at Kuwait.[21]

and *ganja* of the same tonnage could be lined up with barrels over their stemheads and could not be told apart.

In actual practice they are more easily detected. The *ganja* tends to be devoid of the elaborate stern carving of the *baghla* and the *kotia,* and tends to be smaller and more like the *sambuk* in lines. The *baghlas* and *ganjas* sailed by the Arabs of the Persian Gulf and the southern coast of Arabia are never painted, and the bleached hulls above the waterline show heavy rust streaks at every rib from the nails. The Indians keep their *kotias* and *ganjas* excellently finished—compared to the Arabs. The Indians usually keep the topsides heavily oiled and stained, and paint a wide white band following the sheer of the hull and almost touching the water at amidships. Thus the *baghla* is usually differentiated from the *kotia* at sea (when the stemhead cannot be seen) by the finish of the topsides. On the basis of this, the ship shown in the upper part of Plate 9 is an Indian *kotia,* rather than an Arab *baghla,* and Plate XXXVIII in Hornell's *Water Transport* illustrating a Persian Gulf *baghla* is very probably an Indian *kotia.*

There are very few *baghlas* left at the present time, but half a century ago the *baghla* was one of the common deep-sea traders in the Indian Ocean, and the principle deep-sea trader from the Persian Gulf. The double-ended *bhum* has virtually displaced the *baghla* in the Persian Gulf, but the Indians now use many *kotias* for their deep-sea trading. Thus the term *baghla* now tends to be applied to the Indian *kotia,* as well as to the true *baghla.* In another few decades the *baghla* will be virtually extinct, but the name *baghla* will still be heard—applied incorrectly to the Indian *kotia* by the uninformed.

[19] J. Hornell, 'Classification of Arab Sea Craft,' *Mariner's Mirror,* XXVIII (1942), 18.

[20] A. Villiers, *Sons of Sinbad* (New York: Charles Scribner's Sons, 1940), p. 417.

[21] Ibid.

The *baghla* has the largest tonnage of all these ocean-going dhows, being rated as high as 500 tons. The *ganja, sambuk,* and *bhum* all have the same tonnage limit of about 200 tons. This may be summarized, along with the dimensions of the vessels, from data presented by Hornell:[22]

Ship	*Length*	*Beam*	*Depth*	*Tonnage*
baghla	100-140 ft.	20-28 ft.	11½-18 ft.	150-400 tons (occasionally 500)
bhum	36-110	18-23	8-12	60-200
ganja	70-100	18-24	8½-11½	70-200
sambuk	?-70+	?-23+	?-13+	30-200

As a rule Arab dhows have no tumblehome, but the *baghla* and *ganja* are exceptions to this as they have a tumblehome aft starting amidships. All of these ocean-going dhows have considerable sheer rising to a high poop. The mainmast of the large dhows is raked forward, while their shorter mizzenmast has less rake forward (it is almost vertical on the *bhum*). They are relatively narrow-beamed and deep-keeled vessels, so that they should hold their course to windward well, making a minimum of leeway. The *sambuk,* however, is probably a leeward sailor, as Moore[23] tells us that during World War I thirteen *sambuks* were chartered to carry millet from Port Sudan to Suez and, because of persistent headwinds, the fastest passage took three months. Ocean-going dhows are such a characteristic sight to the Indians that an Indian two-masted dhow is depicted on the reverse of the Indian ten rupee note.[24] Villiers[25] claims that a *bhum* can make twelve knots with ease. A *baghla* is every bit as fast, for Colomb states that:

> These vessels are enormously swift: they would tax the powers of our fastest yachts in light winds: the most speedy man-of-war, under steam and sail, has her hands full when she gives chase to them in a breeze. I have doubted of success when rushing after them at ten and a half miles an hour.[26]

In Manama Harbor at Bahrein Island dozens of ocean-going *bhums* are always at anchor. One never sees any of the vessels in the Arabian ports, or the small Bahrein ports.[27] Outside of Ras Tanura and Al Khobar, there

22 J. Hornell, op. cit., pp. 11-40.

23 A. Moore, *Last Days of Mast and Sail* (Oxford: Clarendon Press, 1925), p. 132.

24 The two-masted craft shown on the Indian ten rupee note is probably a *pattamar.*

25 A. Villiers, 'Dhow-Builders of Kuwait,' *Geographical Magazine,* XX (1948), 345-350.

26 Captain Colomb, *Slave Catching in the Indian Ocean* (London: Longmans, Green, and Co., 1873), p. 38.

27 Recently, however, since the Arabian American Oil Company has built two deep-water piers on the Ras Tanura peninsula, these large ocean-going dhows put into Ras Tanura during the pearling season to get water.

is no port on the east coast of Saudi Arabia where deep-draft ships can anchor at low tide. When the tide goes out (maximum tidal drop in the Persian Gulf is eight feet), the Arabian 'ports' of Oqair, Al Khobar, Dammam, Qatif, Darin, Zor, and Jubail are left high and dry often with many miles of flat ground tapering to deeper water. This is typical of all the coastal regions along the Arabian mainland and on Bahrein, and between Arabia and Bahrein there are numerous extensive shoals that dry at low water. Thus, navigation of such waters requires a shallow-draft boat, and such the Arabs of these waters have developed.

The Arabs of the east coast of Arabia and Bahrein sail a shallow-draft dhow, known locally as a *jalbhut*. It is distinctive from all other Middle East dhows, and may be distinguished from other dhow-types by its bolt-upright stem; it is usually single-masted (Figure 2 and Plate 12–lower left). I have seen 70-foot *jalbhuts* with a single mast, but only once have I seen two-masted *jalbhuts*. Among the many dozens of *jalbhuts* and *bhums* which put into Ras Tanura for water during the pearling season in 1947, there was a fleet of eight 55-foot *jalbhuts;* they all were twin-masted. Later, on the flats by Qatif, I saw two of these same twin-masted vessels. Of the hundreds of *jalbhuts,* large and small, seen from Oqair to Jubail, these eight were the only two-masted ones I saw. The fleet of eight was owned by a Bahrein *nakhoda,* who had them beautifully oiled down.

Alan Villiers[28] states that *jalbhuts* are 'used considerably on the Gulf pearling banks, particularly from Kuwait and Bahrein, and also by the Suri and Omani in general in their deep sea trades.' Moore's list of Arab craft[29] shows *'jalba* of Hodeida [Yemen]. Its prow is upright.' There is little doubt that this is the same craft as the *jalbhut* found on the western side of the Persian Gulf. Mr. Alexander C. Brown took a photograph of some Arabs diving for pearls from a *jalbhut* off Socotra Island in the Gulf of Aden in 1930. Hornell[30] states that a 'small *mashwa* is carried as the ship's boat on the main deck of the *baghla,* with a still smaller size, the *jalbuti* (=Jolly-boat), slung across the stern from catheads on the quarter.' This would be quite a feat with the average *jalbhut,* which is from thirty to forty feet in length. It is obvious that Hornell has never been to any of the ports along eastern Arabia or on Bahrein. Thus the *jalbhut* is found from Kuwait down the coast to Oqair, on Bahrein Island, in Oman and Sur, and on the Yemen coast at Hodeida in the Red Sea. It would seem then the *jalbhuts* are much commoner than one would expect from read-

[28] A. Villiers, *Sons of Sinbad* (New York: Charles Scribner's Sons, 1940), p. 418.

[29] A. Moore, op. cit., p. 123.

[30] J. Hornell, 'Classification of Arab Sea Craft,' *Mariner's Mirror,* XXVIII (1942), 21.

ing the literature on the subject. In the shallow waters off the eastern Arabian coast, it may be said safely that ninety-five per cent of all sailing craft are *jalbhuts* (Plate 9–bottom).

The *jalbhut* is round-bottomed and relatively broad-beamed, with a transom stern raked at about 45°. The single mast on the *jalbhut* is raked forward at the same angle as the mainmast on the larger ocean-going dhows. The *jalbhut,* having a square stem, has to carry a bowsprit, which consists of a teak pole projecting from twenty-five to thirty per cent of the over-all hull length. The yard, when lowered on the deck, extends from the end of the bowsprit to a little past the stern of the boat. *Sambuks, bhums, ganjas,* and *baghlas* carry bowsprits similar to those carried by

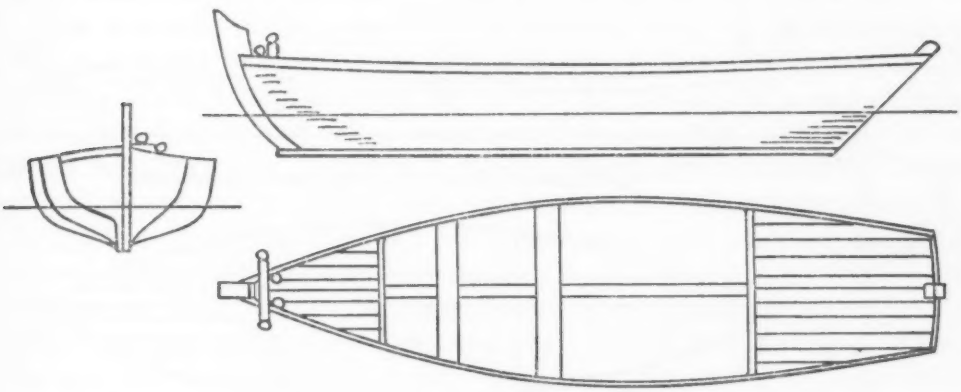


Fig. 8. Plan, sheer, and indicated sections of the *shewe.* The *shewe* is similar to the *jalbhut* except for the curved stem and narrower beam

jalbhuts. It should be remembered that a *bhum* of seventy feet can carry more canvas than a *jalbhut* of the same size, as it draws more water; thus a *jalbhut* can attain considerable size before it becomes necessary to put on two masts, when it is humanly impossible to raise all the canvas on one mast.

The *jalbhut* has a flat, sheerless hull, always with a poop deck and a small forward deck, no matter how small the boat; up to sixty feet these dhows are left undecked amidships, so that more cargo may be stored, even though they run a constant risk of swamping in heavy winds and rough seas when heavily loaded, as an open boat will scuttle under the water like a saucer if one gunwale is allowed to dip under the surface of the water to any extent.

The fastest that I ever managed to sail a small single-masted *jalbhut*

(up to thirty feet) was five knots. This was under ideal conditions, on a smooth sea in a strong wind that had just come up. Ordinarily with a good wind in a small swell the average speed is three knots. All these speeds were determined with a log chip.

There are several other types of small dhows that navigate the waters around the east coast of Arabia and Bahrein Island; these range from fifteen to thirty-five feet in length. One is the *shewe,* similar to the *jalbhut* in all characteristics except its curved stem (Plate 10 and Figure 8). These are seen occasionally rigged for sailing; they are sometimes seen as a long-boat towed behind large *bhums,* although the true long-boat usually has a much narrower beam. There are also a lot of little double-ended *ballams* averaging twenty to thirty feet in length. These little double-ended boats have raked sternposts, stems with a curved cutwater, and are relatively narrow-beamed (Figure 9). These boats sail from Qatif and Tarut Island many miles into the Persian Gulf to fish with three-man crews (Plate 11); how they brave the weather is a miracle. There are a lot of dugout canoes of Indian origin (usually from the Malabar coast), called *houris,* used as tenders on *jalbhuts* and *bhums.*

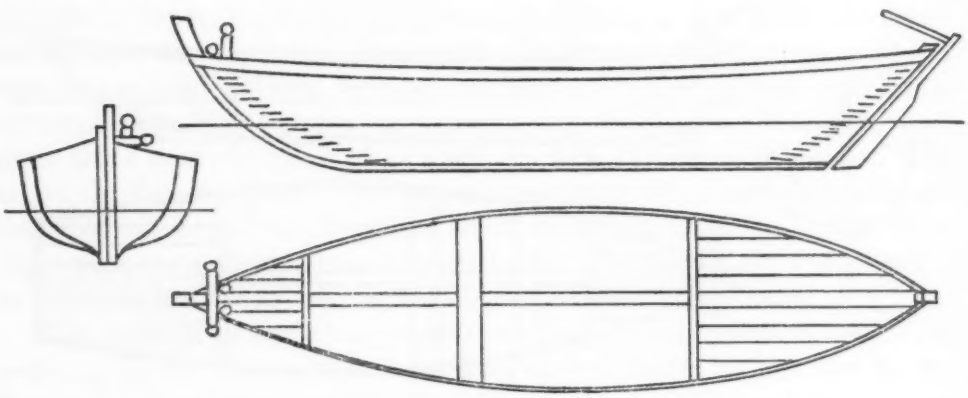


Fig. 9. Plan, sheer, and indicated sections of the *ballam.* The *ballam* is essentially a small *bhum* with a curved stem. Small *ballams* are used in fishing activities in eastern Arabia

On the east coast of Arabia the Arabs apply the term *houri* to dugout canoes and small *shewes,* whether they are used as long-boats on larger vessels or rigged for sailing. My Arab fishermen friends continued to call a small 17-foot *shewe* (formerly used as a long-boat) an *houri,* even after it had been converted to a gaff-rigged fore-and-aft sailboat.

On Bahrein Island I have seen Arab fishermen sailing dugout canoes with a single-masted lateen rig, carrying more canvas than would seem possible. All the dugouts that I saw had widely spaced sham ribs carved in relief on the inside to strengthen the shell. A hole is generally cut through the forward portion of solid wood to take a painter.

The Arabs live on the poop deck of their dhows, huddled under an awning stretched from poles. There is usually a fire smouldering in a fire pit, so that even small Arab boats are in a sense ships. An Arab dhow has a bilge that is beyond description in its filth, as it is never effectively cleaned. It took a week's continued application of DDT to rid a 28-foot *jalbhut* I bought of its army of mammoth cockroaches. The Arabs express their philosophical outlook on sanitary conditions by *kulluh wahid!*[31]

The Arabs have a strange way of beaching a boat. All the dhows that I have seen are provided with large iron rings along the gunwale; the number of rings increases with the length of the boat. On a 30-foot boat there may be only two on each side; on a 60-foot boat there may be as many as six on a side. The boat is run in as high as possible on the beach at high water; as the tide recedes the boat's keel soon comes to rest on the flat bottom. When the craft first rests firmly on the bottom the crew run around and drop poles over the side so that they are resting on the bottom and lash these to the rings along the gunwale. The poles have a little cross peg at the top to keep the rope lashing from slipping. When the tide has completely receded the vessel stands upright, looking like a many-legged bug that might have crawled out of the sea.

III

Shortly after the arrival of the European powers in the waters of the Indian Ocean, there was a rapid evolution in the design and construction of Arab and Persian craft. In 1497 the Portuguese navigator Vasco da Gama sailed around the Cape of Good Hope; for about a century after this the Portuguese dominated the Arabian Sea, the Red Sea, and the Persian Gulf. As the Portuguese power waned the English, French, and Dutch entered the struggle for supremacy; the British finally ended up as the dominant power.

Many of the present day Arab sailing craft retain certain features copied from the early European vessels. Certainly the *baghla* when viewed from the stern quarter looks like an eighteenth-century galleon (Plate 9). When you first sight one of these craft under sail you suddenly feel that you have been dropped back several centuries and wonder if perhaps you

[31] Arabic for 'What difference does it make!' (Actually: '[It's all] the same.')

are not dreaming. In the case of some of the *sambuks* in the Red Sea the decorative painting on the upper works is similar to the painted work on an Elizabethan galleon, while the vertical median section is similar to that of a sixteenth-century warship with its upper deck removed.[32]

The double-ended craft that the Arabs sail, i.e., the *bhum, ballam, badan* (of Oman), and *zarook* (of the Red Sea), undoubtedly represent the more primitive types of craft and are probably embodied with many of the characteristics of the ancient craft from which they are descended. It is interesting to note that the bows on the *baghla* and *sambuk* are in style with most of the double-ended craft; thus the Arabs (and Persians) copied the square transom stern of European galleons, but retained their own sharp bow typified by the *baghla, sambuk, shewe,* and *jehazi* (of Zanzibar). The *jalbhut,* with its bolt-upright stem, seems to be in a class by itself so far as bows go.

More revolutionary than the change in design was a change in the method of construction of Arab sailing craft. Before the intrusion of Europeans into the Arabian Sea, Persian Gulf, and Red Sea waters, planking, instead of being nailed to ribs, was fastened edge-to-edge by sewing with twine made from local fibers. This method had been used in these regions for thousands of years, and every traveler or explorer in the region made note of this sewn construction. Alexander's admiral, Nearchus, observed such construction in the Persian Gulf in 326 B.C. *The Periplus of the Erythraean Sea,*[33] written by a Greek sailor in about 60 A.D., mentioned that such construction was carried out in Rhapta (a port in East Africa) and that Ommana[34] exported to Arabia[35] a peculiar species of vessels called *madarata,*[36] sewed together after the fashion of the place.

In the last of the thirteenth century Marco Polo visited the Persian Gulf and described the boats that he saw at Hormuz:

> Their ships are wretched affairs, and many of them get lost; for they have no iron fastenings, and are only stitched together with twine made from the husk of the Indian nut. It keeps well, and is not corroded by sea water, but will not stand well in a storm. They have one mast, one sail, one rudder, and have no deck. . . . Hence 'tis a perilous business to go a voyage in one of these ships, and many of them are lost, for in that Sea of India the storms are often terrible.[37]

[32] J. Hornell, 'Classification of Arab Sea Craft,' *Mariner's Mirror,* XXVIII (1942), 39.

[33] W. H. Schoff, *Periplus of the Erythraean Sea* (New York: Longmans, Green, and Co., 1912), p. 28, 36.

[34] A trading town on the southern Persian Gulf shores mentioned in antiquity, not to be confused with Oman. Its exact location is unknown today.

[35] Arabia here probably refers to South Arabia, i.e., Hadramaut and the Yemen.

[36] Arabic for 'fastened with palm fiber.'

[37] H. Yule, *Ser Marco Polo* (2nd ed., London: John Murray, 1875), I, 111.

At about 1800, hulls were still made at Kosseir (a port in the Red Sea) by sewing, for Bruce relates how a

> vessel had one sail, like a straw mattress, made of the leaves of a kind of palm tree .... It was fixed above, and drew up like a curtain .... But, by way of indemnification, the planks of the vessel were sewed together and there was not a nail, nor a piece of iron, in the whole ship; so that, when you struck upon a rock, seldom any damage ensued.[38]

In 1828 Kempthorne visited the eastern shores of the Persian Gulf and noted that the boat the natives constructed was

> a canoe made of several small planks nailed or sewn together in a rude manner with cord made from the bark of date-trees, and called *kair,* the whole being then smeared over with dammer or pitch.[39]

In all the areas we have been considering the natives originally employed sewn hulls. European intrusion into these waters hastened the use of iron nails and spikes for fastening the planking to the ribs and hitching the ribs to the keel. One should not get the idea from Marco Polo's skepticism that sewn-hull construction limited the size of the ships to any serious degree, for Sir Frere[40] writes, 'I have seen [stitched vessels] of 200 tons burden.' This is larger than the average ocean-going dhow of present times built with iron nails. The Persian fleet that sailed from the Persian Gulf to Yemen in 574 A.D. was most certainly of sewn construction, as was the Perso-Arab fleet dispatched against Sind in 712 A.D. The advent of iron nails simply meant greater security at sea and less overhaul.

Descriptions of construction methods as described by early European travelers may be misleading by indicating that sewn construction was more widely used than it really was. In their wanderings travelers described what seemed strange to them; they never described the commonplace. Such would be particularly true in the case of boat construction, as a boat with its planks sewed together would be quite a curiosity to a person who had never seen such before. The early Greeks and Romans used nailed construction, so this sewn construction was strange to even them. The practice of sewing planks together would persist in some areas longer than others, as evidence of the earlier and more primitive type of construction, and these locales would be sure to receive the notice of travelers. Certainly Bruce's craft is a primitive type, as it had a palm mat sail

[38] J. Bruce, *Travels to Discover the Source of the Nile* (2nd ed., Edinburgh: Archibald Constable and Co., 1805), II, 107.

[39] G. B. Kempthorne, 'Notes on the Eastern Shores of the Persian Gulf,' *Journal of the Royal Geographical Society,* V (1835), 273.

[40] H. Yule, op. cit., p. 119.

in addition to its sewn hull. Iron nails would find use in large ships before they would in small craft. Travelers would also have more chance to observe small boats drawn up on beaches than large ships. Very probably iron fastenings were used by the Arabs for their larger craft in some areas long before the eighteenth century. Iron nails are not universally used by the Arabs even today, for there are sewn hulls to be found in isolated spots along the Indian Ocean coasts, in exceptional backwaters of life that are immune to all changes and progress that has been going on around them for century upon century.

A boat that is a hundred years old is a museum piece in the United States; design has changed rapidly making boats obsolete and the marine borers take their toll on underwater wooden portions. In Arabia a boat a hundred years old is considered young. There has been no change in design in Arab boats for dozens of years, and there is reason to believe that similar boats have sailed the same waters for over a thousand years; the attack of marine boring worms is efficiently resisted by the tallow and lime mixture put on the bottoms. Boats are handed down from father to son in Arabia; new boats are relatively expensive as the wood and all other materials must be imported. If the keel rots out, a new keel is installed, or a new piece is spliced in. Planks are left on and any holes plugged and wedged until a new plank is a necessity; ribs often have to be replaced near the keel, as an Arab boat always has water in the bilge. Gunwales must be replaced when they are worn away, from just bare feet stepping on them. The Arabians of the east coast of Arabia (not including Kuwait) seem to be capable of replacing ribs and planks only; for a major job, like replacing a keel, they have to go to Bahrein Island.

The fastenings often may lead to trouble, as they are all iron. The planks are all held on with nails which are driven in untreated. The nails rust fastest at the interfacial point between the plank and the rib, as corrosion will be most severe where iron is subjected to the effect of salt water and air. The nails rust in the wood, but their rate of corrosion is slow. A dhow may theoretically start to fall apart with good wood still in her, due to a failure of the nails, but this seldom gives serious difficulty, as the oxide scale that is built up tends to protect the iron from further corrosion. Usually the corrosion is worse where the wood rots out, so that, when the wood is replaced, new fastenings are put in. Thus, as the decades march on, the dhow may have new wood and fastenings in her, but she is the same ship, and will never be junked.

The Arab dhow never grows old; her hull design has stayed the same

for decades and her teak construction makes her a hardy craft. In America, people are continually buying newly designed craft; boat yards are full of boats that have seen the water for the last time. There is a constant demand for new boats in America, so that boat yards are continually occupied with new construction. In Arabia, new boats are bought only because a man has lost a boat at sea or because he is expanding, never because he just wants a new boat; there are no pleasure craft in Arabia. The Arab shipyards are never booming on new construction to the extent they are in America; a large portion of the yearly construction in the Persian Gulf is on boat repairs.

The construction of a new sailboat in Arabia is carried out in ways fundamentally different from in America. In the first place, the boatbuilder constructs only the hull with its mast and yard, bare of rigging and sail. The hull is always turned out with the wood unfinished; in most instances it has been caulked. After the hull has been completed as far as the woodworking goes, the sailors who will eventually sail the boat take over and finish the bottom and topsides, and make the necessary rigging. Teakwood blocks are purchased in a local junk shop. After the rigging is completed, they make the sail from actual measurements of the boat, although for dhows under forty feet, the sail is often purchased from a sailmaker. As an additional saving, the purchaser may buy the teakwood from India and supply it to the boatbuilder, but most boat yards have their own lumber yards.

The Arabs do not use any plans or patterns in the construction of a dhow; there is not even a sketch in the sand. I have visited the Bahrein boat yards and watched in amazement the construction of *jalbhuts* and *bhums* over a period of weeks, as the Arabs constructed a ship by eye from experience. The *jalbhut* keel is laid first, then the vertical stem and the 45° transom are set up. It is after this that the shipwright's experience comes into play. Several ribs are set up between the stem and the transom in the proportions that the shipwright thinks correct, and braced; several planks are laid next and the rest of the ribs are filled in. After all the ribs are in place the planking is completed.

The ribs are made of small trunks of Persian hardwood selected because their shape approximates the contour of the boat. Every other rib runs through the keel; alternate ribs start on each side of the keel. The planks are put on in more or less logical order, but no attempt is made to fit or spile them. All *jalbhuts* are carvel-built (as all other Arab dhows), and single-planked. When they have finished running the planks,

there are a lot of little spaces, maybe one inch by six inches, that are filled in with little patches. All planks and patches are nailed on with large-headed hand-wrought iron nails clinched over on the inside of the ribs; these nails stain streaks down the outside of the hull. The nails are made locally by blacksmiths from any available piece of scrap iron.

All woodworking is done by hand with small tools of a primitive form. For drilling holes the Arabs use a bow-drill instead of a brace and bit; holes are drilled for every nail, mainly because the dense teakwood would split if a coarse iron nail were driven in with a large hammer. They use pull-saws[41] for cutting all planking and splitting teak logs into planks.

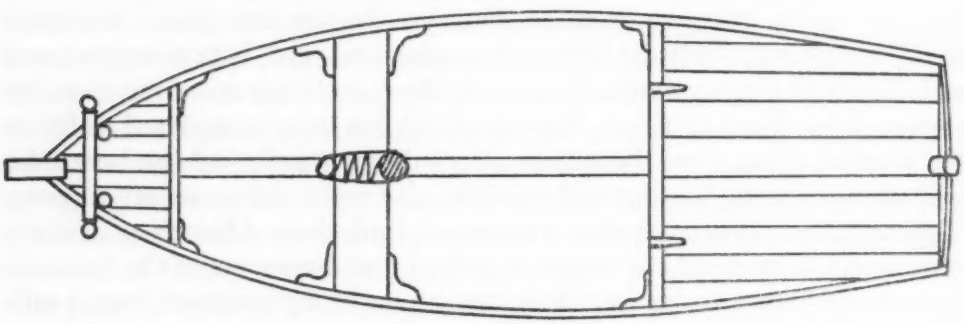
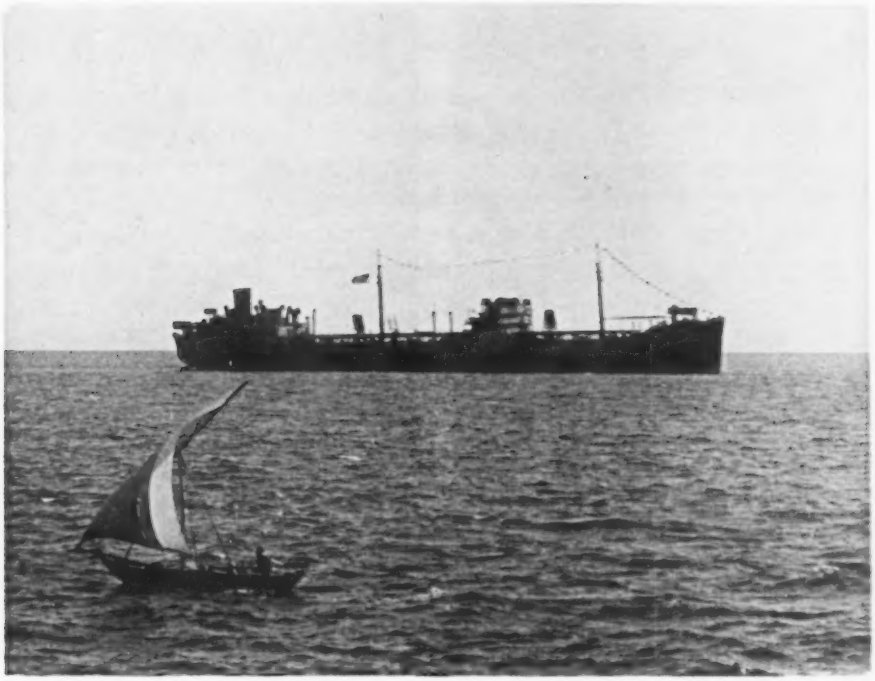


Fig. 10. Plan of a *jalbhut*. This is similar to that of small dhows in the Red Sea and other waters. Generally speaking, the Arab prefers to leave the waist undecked

The saws used for cutting boards look much like keyhole saws, so small are they. For planing they use small wooden block planes. For roughing out keel, stem, and stern members the Arabs simply use a small adze. To construct a 100-ton ship using such small hand tools requires time, patience, and endurance.

All the *jalbhuts* that I saw were constructed in the same way. Three stout beams tied the two gunwales together; knees were placed at each end to strengthen the joint (Figure 10). The poop deck was carried by the after beam, the forward deck by the forward beam. The mast is stepped in the keel and rests in a notch in the center beam (the mast bench), which is much stouter than the other two. A short member is stepped in the keel forward of the mast bench, and the mast is strongly lashed to this short member. The mast is a stout teakwood pole stepped forward, with a pronounced rake. The yard is made of several teakwood spars spliced

[41] A saw that cuts on the upstroke rather than on the downstroke, as Americans are accustomed to.



A *ballam* with a three-man crew setting out into the Persian Gulf to fish

A *jalbhut* with the sail area reduced by lowering the yard. The Arabs use this method of accomplishing a reef if rough weather comes up, as their sails have no reefs

The Nasir brothers, Leh'down and Hasen bin Nasir, who taught the author the finer points of sailing a dhow

Note the half hitch fastening the shrouds in true Arab style. This hitch tends to work loose quickly so the mast essentially stands unsupported

Open-waisted *jalbhut* sailing close-hauled to the wind in rough weather. One can see that such a craft can be easily swamped

The author's *jalbhut* on the beach at Ras Tanura

Close-up of the bow of a *jalbhut*, showing rope fastenings on teakwood bowsprit

together by fishing and lashing to give a tapering spar about thirty per cent longer than the boat; the yard is hung from its center.

On all *jalbhuts* there are two bitts projecting above the gunwale at the bow and fastened to a cross member of the same diameter projecting over the gunwale line on both sides. These bitts extend downward like ribs and are nailed to the forward planks. The anchor line runs over this crossed structure instead of through hawseholes, and is belayed to this double bitt when the anchor is down. This double-bitt structure is found on most dhows (Figure 11).

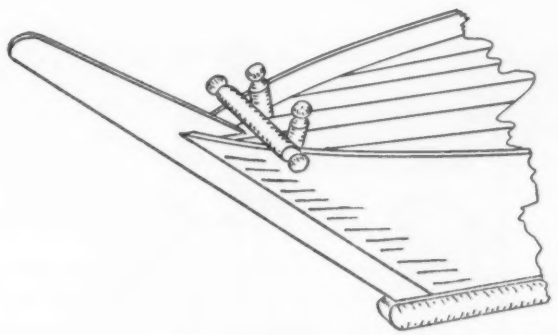


Fig. 11. Double-bitt structure on a *bhum*. This arrangement is universally found on Arab dhows. Anchor lines are belayed to these bitts

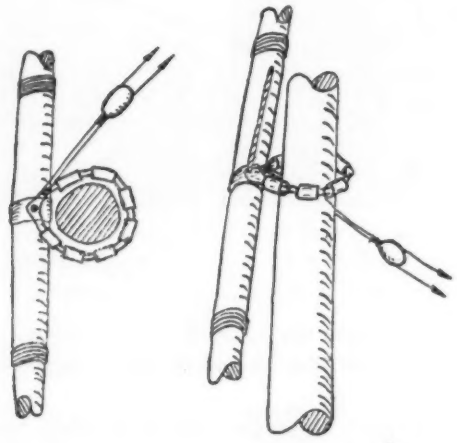
As far as the natives are concerned there is only one way to finish the outside of a boat. Above the waterline they rub on fish oil periodically to keep the topside wood from completely drying out. This has a beautiful appearance from a distance when fresh, looking like a varnished surface, but permeates the air with a foul odor, appalling in its pungency. A few days of salt water spray leaches it out again. The majority of the time the topside of a *jalbhut* is in this bleached-out condition. Below the waterline they rub in a mixture of lime and tallow in a thick paste. For caulking they use sheep's wool.

A single-masted dhow is very simply rigged, but handling the rigging is fundamentally more difficult that on a fore-and-aft-rigged sloop. The yard is hoisted with the main halliard (Figure 2) and the sail is controlled by the mainsheet and the tack purchase. On small dhows under forty feet in length the main halliard leads to a gun tackle purchase;[42] as the size of the dhow increases the purchase is increased to a single and double block and then to two double blocks. It is a sight to see eight men on a 70-foot

[42] Two single blocks with the standing part of the fall bent to the top block, from which the halliard leads.

single-masted dhow laying to a two-part twofold purchase;[43] they all climb as high as they can and throw themselves to the deck as the halliards come down, uttering praises to Allah.

The halliard is permanently rove over a sheave in the masthead. The after end of the halliard carries the upper block of the halliard tackle, while the fore end is made fast to the yard. In large dhows the halliard is double and is rove over two sheaves in the masthead. The top halliard block is then stropped in a bight of the halliard. The halliard is just long enough so that the top block of the halliard tackle is at the masthead when the yard is lowered on the deck. The halliard is tied securely to the yard;



b

Fig. 12. (a) Plan of the parrel arrangement used on Arab dhows. A collar of wooden sleeves is passed around the mast to hold the yard in place and still allow movement (the halliard is the black dot on the yard); (b) Elevation of parrel arrangement, with the arrows pointing to the running ends of the backstay (the halliard is the rope leading up from the yard)

a parrel keeps the yard close to the mast and yet allows it to swing freely. The parrel consists of hardwood sleeves threaded on a bight of rope. Before being made fast to the yard, the halliard is passed through the bight. The collar of sleeves is passed around the mast and the running ends are passed through the bight and thence stropped to the upper block of the backstay (Figure 12).

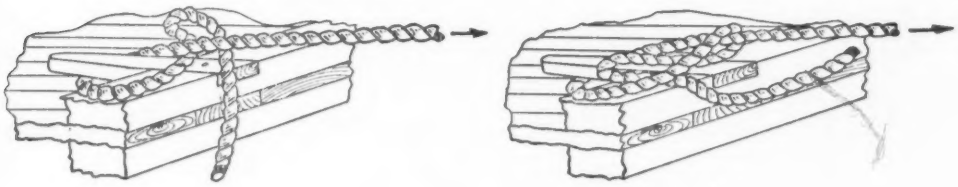
The backstay tackle usually consists of a runner.[44] After the yard has been hoisted the backstay is always made fast aft and to windward (Figure

[43] Two four-sheave blocks with the standing part of each fall and each halliard on the same block.

[44] A single movable block and fall.

12). Taking up on the backstay tackle accomplishes a dual purpose—the parrel is tightened, thus bringing the yard snugly into the mast, and the mast is braced to aft. The backstay is used as a downhaul for the yard if the parrel happens to hang up, but usually the weight of the yard and sail is enough to bring the yard down when the main halliard is released.

On small dhows the mainsheet is direct; on dhows over thirty-five feet long a runner is hitched to the sail. On larger dhows a gun tackle purchase must be introduced. Being cautious sailors, the Arabs never cleat a sheet down permanently. The running end of the sheet is belayed with a 'slip-



a b

Fig. 13. (a) The 'slippery hitch' used to belay the mainsheet to the poop deck. (b) The 'slippery ring knot' used to belay the sheet to the poop when the 'slippery hitch' fails to hold in strong winds. (The arrow points to the sail; forward is to the right on each sketch, aft, to the left.) For the location of the half-cleats see Fig. 10

pery hitch' so that it can be released by a jerk. A bight is placed over a teakwood half-cleat on the edge of the poop deck and a bight on the running end is then passed under the sheet return (Figure 13a). The slippery hitch holds securely when there is a moderate strain on the sheet; in very strong winds the hitch tends to slip and a 'slippery ring knot' must be made by pulling a bight back through the loop of the first bight (Figure 13b). This hitch may still be released by a sharp pull.

The sheet is bent to the clew of the sail by a 'sheet bend,' made by passing the end of the sheet up through the eye of the clew, around the back of it, and under its own part (Figure 14). The only difference in the sheet bend and the 'weaver's knot' is the fact that the weaver's knot is made on the bight of another line rather than on an eye. On some dhows over forty feet I have seen the sheet secured to the clew by means of a wooden toggle which is passed through the end of an eye on the sheet (Figure 14). The forward foot of the sail is held down by a tack. When sailing to windward, the tack is hauled out on the bowsprit; when going downwind, the tack is fastened amidships.

There are three sets of stays on a single-masted dhow—two shrouds and the backstay. The shrouds are fastened to the top of the mast and the backstay is essentially hitched to the yard. When getting ready to sail, the Arabs set the yard to leeward, bend the sail onto the yard, and then set both shrouds to windward. The stay arrangement is the main inconvenience in the lateen-rigged dhow, for the shrouds are not stationary and must be shifted whenever the position of the sail is dynamically changed. Whenever the sail is dynamically changed when under way, the mast stands unsupported. Thus the dhow has no standing rigging. When

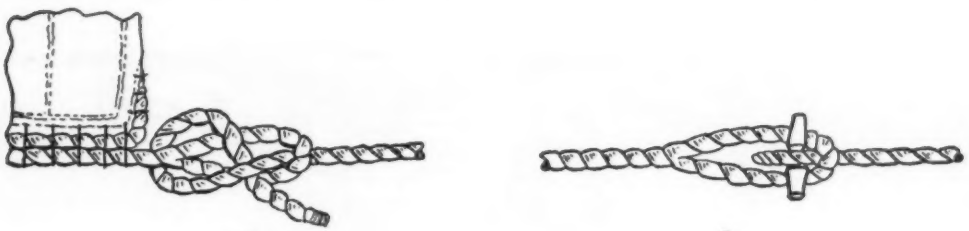
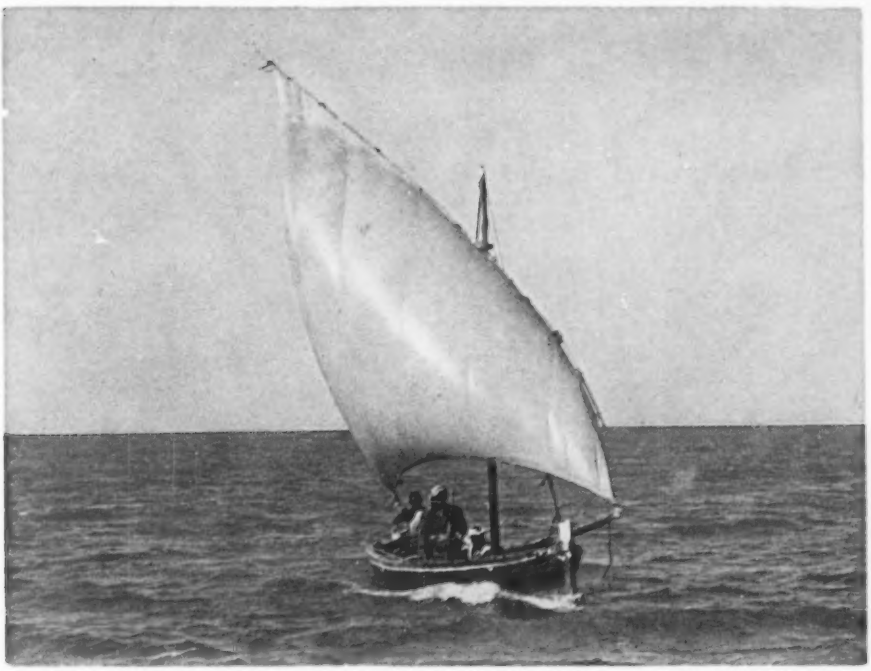


Fig. 14. The sheet is fastened to the sail with a sheet bend as in (a), or by a toggle on larger craft as in (b)

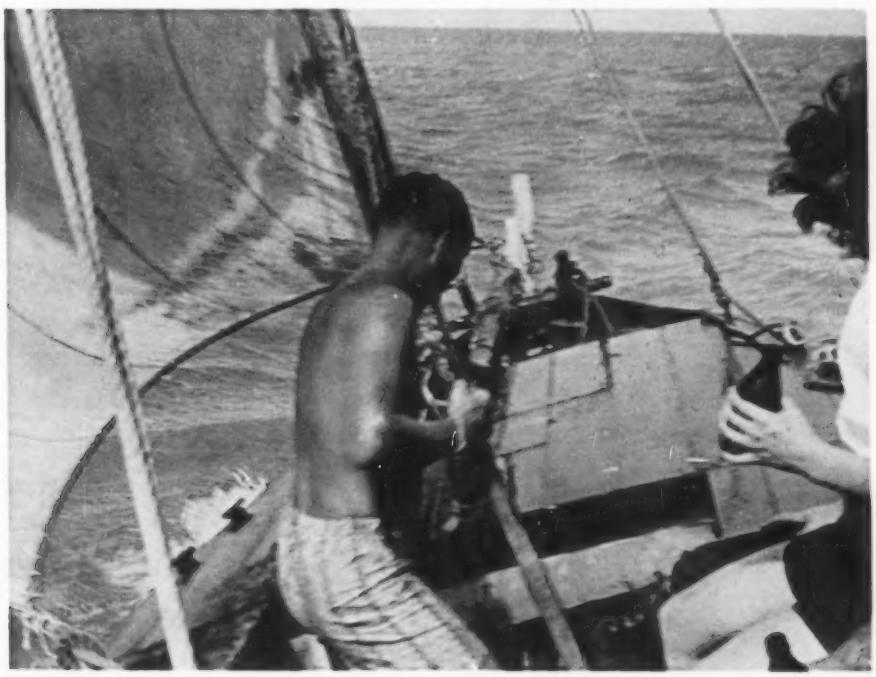
the single-masted dhow is at its moorings the two shrouds act as the only standing rigging, one being set on each side of the mast and forward. The shrouds of a lateen-rigged ship are in vivid contrast to a square-rigged ship where the shrouds are set up before any other rigging and always remain in position.

The shrouds and the backstays on dhows up to forty feet consist of simply a runner. On one end of the line there is usually a hook which is put through a ring on the gunwale. The running end of the tackle is then put through the ring, brought up, and a half hitch made around the two tackle returns. The hitch is finished off by drawing a bight on the running end and pulling it through the tackle returns already frapped together. Such a hitch is not satisfactory as it tends to work loose, but the Arabs swear by it (Plate 12–upper left).

The Arabs usually sail with a steadying line attached to the upper end of the yard; this may be called the vang. In average circumstances this line is left slack and not used, but there are certain times when its use is a necessity. When sailing downwind, the vang is essential if a yaw is encountered, as without it, the yard slaps around dangerously. Also, when sailing to windward, the sail may be steadied with this line. When coming

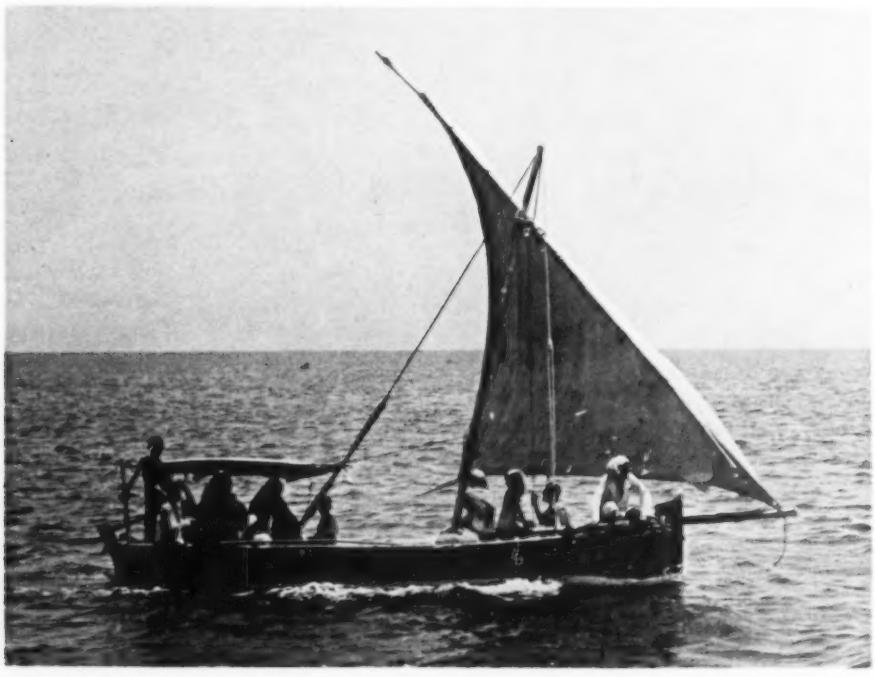


A small *jalbhut* sailing close-hauled to the wind. The Arabs in this craft had been throwing water on the sail in an effort to seal every pin-hole and beat the author's *jalbhut*



The author's *jalbhut* in a strong breeze. Note the shrouds cleated down to the deck. When a *jalbhut* is heeled so that the topsides are below water the bilge pumps must be manned constantly as leakage is considerable

A large *jalbhut* sailing down-wind as viewed from the stern quarter. The sail is set athwartships



A *jalbhut* sailing down-wind in a quartering wind. Note that the sheet is fastened on the leeward side

about downwind, the vang is essential in a quick maneuver to pull the yard over on the opposite side of the mast after the yard reaches its vertical position.

When you first look at an Arab *jalbhut* you are amazed to see how small the rudder is, but after you learn how the Arabs sail, you understand why they use such a small rudder. The first thing I did after I bought a *jalbhut* was to install a much larger rudder. I realized that the Arabs sailed them with their small rudders, but I refused to admit that I could do it; unless one understands the finer points of sailing the dhow, it cannot be done.

The rudder is symbolic of ownership in Arabia. Whenever entering a port in Saudi Arabia, the captain of the boat must bring his rudder to the police station and leave it, much as we would deposit the ship's documents with the port authorities (Plate 10). When he gets ready to leave he states his destination and passengers and collects his rudder. If he should sail without permission (not having deposited his rudder), he is very likely to get his rudder locked up the next time he enters the port. The Arab would never think of getting another rudder; he simply waits for the law to reinstate him. It should be remembered that as a rule only *jalbhuts* visit Arabian ports, so the rudder is not sizable. It would not be feasible to unship the rudder on a large dhow (*bhum* or *baghla*).

The sails on dhows are without exception quadrilateral.[45] If allowed to hang from the yard so that the foot is level with the water, the head of the sail makes a 45° angle with the leach, which is in turn perpendicular to the foot. The luff is small and usually varies from about fifteen to twenty per cent of the leach. The sail is bent onto the yard by a series of robands which are passed around the yard very much in the manner of reef points. The sail cloth is usually coarse Indian canvas; often it is so 'moth-eaten,' with holes all over it, that the Arab sailors have to spend a lot of time mending their sail.

The dhow sail does not have a reef that can be rolled up and tied because there is no boom at the bottom of the sail and the bottom must be kept free. The Arabs sometimes have a detachable reef or bonnet which is fastened to the leach of a smaller sail (Figure 2), but usually they carry

[45] Some people are under the impression that the mizzen on two-masted dhows is sometimes triangular. This probably stems from the fact that the Arabs place a tack purchase far forward and sometimes haul the tack so far forward that the mizzen looks triangular. Villiers, 'The Arab Dhow Trade,' *Middle East Journal*, II (1948), 402, shows a drawing of a *bhum* with a triangular mizzen. This drawing has been made from a photograph taken by Villiers and reproduced twice by him: 'Dhow-Builders of Kuwait,' *Geographical Magazine*, XX (1948), 350; 'Sailing with Sinbad's Sons,' *National Geographic Mazagine*, XCIV (1948), 682. The artist who drew the picture for the *Middle East Journal* has failed to observe that the wrinkles in the sail, the angle of the leach, and the fact that the mizzen yard ends aft of the mainmast, all indicate that the mizzen is quadrilateral instead of triangular.

two sets of sails, a small and a large, as their sail cloth is generally so rotten that the fabric will not stand the strain where the two pieces are joined, as there is nothing to stiffen the grommets on the leach. An addition of forty per cent to the length of the foot of the sail will increase the area of the sail from seventy to seventy-five per cent, as the area is added to the leach where the sail is highest; an increase of only ten per cent adds about seventeen per cent to the area. The large sail that the Arabs carry completely fills the yard, and the tack comes almost to the end of the bowsprit when the sail is hoisted; the smaller sail that they bend in rougher weather leaves an overhang on both ends of the yard and the tack is fastened to near the stem. The sail area on a dhow can be reduced while under way by lowering the yard a little (Plate 11–bottom); the sail simply spills out like a genoa jib. The boat cannot be sailed as close to the wind with the sail in this position.

Square-rigged ships used to have reef points on square sails below the head of the sail, so that the sail could be reefed onto the yard. There is no reason why a lateen sail could not be reefed in this same manner, *if* it were perfectly triangular with no luff. A drawing, dating about 1761, of a three-masted lateen-rigged Spanish xebec[46] shows just such an arrangement on the lateen sails, with reef points along the head of the sail. As the triangular lateen sail is reefed, it is uniformly shortened on each end of the yard. A lateen sail with a luff cannot be reefed like this, as the luff would project over the end of the spar; this may be easily seen by sketching a lateen sail with a luff and drawing a reef point line at the head.

The Arabs construct their lateen sails in a way fundamentally different from the way we do on our fore-and-aft rigs. They always run the seams absolutely vertical, just exactly at right angles to the way that we run the seams in our present fore-and-aft mainsail, or at 45° to what we might expect on a jib of the same shape as the lateen sail. Here again, this is probably because the sail cloth is weak, and would tear if the seams were run horizontally.

As was mentioned above, most single-masted dhows carry at least two sails—a large sail and a smaller one. Some very large single-masted dhows have a third lateen sail still smaller than either of the others, and a very small triangular trysail that is used for moving about in harbors when they do not want to lift a full spread of canvas. Many of the large two-masted dhows carry these sails, but also they use them as jibs in addition to their other sails. A two-masted dhow with such a jib is a beautiful sight beating to windward.

[46] R. C. and R. Anderson, *The Sailing Ship* (New York: McBride, 1947), p. 176.

IV

For two and one-half years I lived at Ras Tanura on the Persian Gulf coast of Saudi Arabia. During this time I sailed constantly with the Arabs, on their own dhows (*jalbhuts, ballams,* and *shewes*) and on my own 28-foot *jalbhut*. Learning to sail a lateen-rigged dhow as skillfully as the Arabs do required months of practice with an Arab crew. At one point I considered that I knew 'all there was,' and took out alone, only nearly to rip the mast and rigging off by forgetting one little part of the technique of bringing a dhow about. Not even now do I consider that I know everything about sailing a dhow, but I have learned a lot about how the Arabs sail their single-masted dhows. I was taught the finer points of sailing by the Nasir brothers, Hasen bin Nasir and Leh'down bin Nasir (Plate 12). Like most Arab sailors, they were skillful, but would not change their set manner of sailing or accept changes in the rigging of their age-old dhow. Previous to coming to Arabia my sailing experience had been acquired through sailing an 18-foot Cape Cod Knockabout on Narragansett Bay.

As I have already stated, the first thing I did after I bought a 28-foot *jalbhut* (Plate 12–lower left) was to install a larger rudder to give it faster maneuverability, and deck over the waist so that one could heel the boat without fear of the sea coming in. I installed cleats to belay the movable shrouds to (Plate 13–bottom), put a sheave on the bowsprit, and bolted the bowsprit to the deck. Whenever I sailed with an Arab crew, they used to grumble about the boat's equipment; they could not do anything about the large rudder or the deck, but they never used the cleats or the sheave on the bowsprit. They made a half hitch back on the shroud line to fasten it (Plate 12–upper left), and climbed out on the bowsprit to hitch the tack of the sail. Never would the Arabs use any of our red anti-fouling paint on their boat bottoms, even though their white-bottomed hulls collected twice as many barnacles as our anti-fouled bottoms, while lying side by side.

Viewed from astern when sailing downwind, a lateen sail is in all essential points a square-rigged sail. The sail is bent to a yard, which is hung from the mast and lies athwartships. The foot of the sail is flat and the two bottom corners are belayed to the deck (Plates 14–top and 15–top). As the boat comes around into the wind so that the wind is abeam, the tack purchase must be belayed to the bowsprit. In this way the sail may be pointed into the wind in a way in which a square sail cannot. As the lateen sail points into the wind the yard acts essentially as a long tilted mast. The basic difference between a lateen-rigged sail and a square-

rigged sail is the angle at the top of the sail, a lateen sail having about a 45° angle at the top so that it is essentially triangular. It is the ability to point a sail into the wind that first made it possible to sail well to windward.

With a lateen-type sail, a boat can start out downwind with the sail essentially in the same position as a square-rigged sail. Then as the boat starts to head up into the wind, it becomes necessary to drag the tack forward towards the bow and belay it. The mainsheet is gradually hauled in, remaining on the leeward side (Plate 14–bottom). As the boat comes around further so that the wind is abeam and the boat starts reaching, the sail and rigging remain about the same. When the boat comes from a broad reach with the wind abeam to a close reach, the mainsheet is shifted to the windward side and trimmed slightly. As the boat assumes a close-hauled course the mainsheet is trimmed smartly and the boat beats to windward in true fore-and-aft style (Plate 13–top).

The bowsprit on an Arab dhow consists of a teakwood pole, which lies on the port side of the extended stem of the boat and extends back to the mast. On small dhows up to forty feet in length the Arabs do not have their bowsprit fastened solidly; they hitch it with a couple of turns around the stem and around the mast (Plate 12–lower right). In going from a downwind position to windward they simply tie the end of the sail onto the end of the bowsprit, shove it out, and make the end fast to the mast. The only fault in this system lies in the fact that the bowsprit tends to work constantly aft, as there is no resistance to motion in this direction. Thus the boat tends to become dynamically unbalanced and the bowsprit has to be frequently pushed out again.

On larger boats, above forty feet, where it is inadvisable to handle the sail manually from risk of being pulled overboard, the bowsprit is fastened rigidly in place and is fitted with a sheave on the outboard end. There are usually two tack purchases hitched to the forward foot of the sail in this case, so that when turning from a downwind position to windward the tack purchase belaying the sail amidships may be released and the sail may be hauled out on the bowsprit with the other tack purchase (Plate 15–top).

The Arabs like to sail a boat so that the boat heels a minimum amount. This probably stems from the fact that they never have the waist decked over and thus there is a constant risk of swamping the boat if it is heeled too much (Plate 12–upper right). Also, a level boat is more comfortable than a heeled boat. The Arabs have very reduced profiles on their boats, so that when they are loaded they *have* to sail the boat virtually upright

as there is little freeboard left. The Arabs load a boat so that only a few inches of freeboard remain (Plate 15–bottom); occasionally they get caught in rough weather and scuttle, but this rarely happens. When heavily loaded and ready to sail, the gunwales of a *jalbhut* are sometimes heightened at the waist with palm-leaf mats lashed to short posts set in the gunwale, if rough weather is expected. This tends to protect the cargo lying in the open hold from spray and actually to keep the sea out. One might wonder why a false gunwale has to be added, and why the gunwale was not originally built higher. The answer is to be found in the sailing characteristics of the *jalbhut;* the *jalbhut* is a notorious leeward sailer and when the boat is empty the gunwale must be as low as possible (the minimum is the difference between the waterlines when the boat is empty and when it is loaded) so that as little profile as possible is offered to the wind.

I once saw a fleet of four 40-foot dhows, heavily loaded with building rock which had been pried from the bottom of Tarut Bay, at definite odds with the elements. They had been caught in a wind which had shifted rapidly from west to south. There were reefs on one side and the Ras Tanura peninsula on the other. They had almost beached their boats on the shore rather than risk scuttling in deep water in the rising chop of Tarut Bay. After a bad storm in 1945 I saw the remains of a 45-foot *jalbhut* which had foundered off Ras Tanura. The craft had been heavily laden with dates—an extremely dense cargo. Three of the four-man crew were drowned when the ship slipped beneath the waves. Had these Arabs had the Yankee presence of mind they would have jettisoned the cargo, rather than go down with it. But they had figured that Allah had turned the elements against them and thus the situation was hopeless. When I saw the boat, it had split through the waist and was but flotsam on the beach. There were dates strewn for miles up and down the beach, some still in palm-leaf baskets.

I used to sail a decked-over dhow with a plank of the deck in the water (Plate 13), much to the displeasure of any Arabs who might be present. The Arabs have none of our taste for the thrill of speed and blown spray when sailing; in fact they never sail in rough weather unless caught out in it. In the face of disaster they seem to lose all sense of reality and start moaning and wailing to Allah. In regard to rough weather, the Arab sailors seem to be affected in the same way as their landlubber brothers; they roll up in blankets or wrap their headdresses around their faces and go into a trance-like sleep whenever the *shamal* (the strong north wind that seasonally brings the dust storms) rolls in. The Arabian American Oil

Company Marine Department had to man a native launch themselves during a *shamal* to rescue an American-owned dhow which had broken loose; the Arab crew of the launch refused to go out in the *shamal*.

A lateen-rigged dhow is constructed so that it may be dynamically balanced, putting a minimum pressure on the rudder, by pulling the outward foot of the sail in or out on the bowsprit. A lateen rig reacts exactly the same as any other rig in regard to the helm characteristics. A properly balanced dhow has a weather helm; when the wind increases the boat tends to head up into the wind. If the sail is not adjusted properly the craft will have a lee helm; with increasing wind the craft will lay off the wind. A lee helm is a very undesirable quality in any boat, but it is easily remedied on a lateen rig. A lee helm is caused by too much sail area forward of the center of lateral resistance of the hull. To counteract this, area may be added to the forward part of the underwater hull by moving live or fixed ballast forward[47] or area may be moved aft in the sail. In the dhow this is easily done by hauling in the tack slightly. This is why the Arabs are able to use such ridiculously small rudders. A dhow reacts the same as any sailing craft in regard to shifting weight. When sailing to windward a movement of live ballast forward will tend to head the boat up into the wind; a movement of live ballast aft will tend to lay the boat off from the wind.

As the wind increases in velocity, the skipper of a fore-and-aft rig feels himself pulling on the tiller more and more to keep the boat on its course to windward (assuming that it has a weather helm). In a strong wind the cautious Arab has already put up his smaller sail; he never fights the rudder to keep the boat on its course, he simply hauls the foot of the sail out farther on the bowsprit, thus balancing the boat by shifting the center of effort of the sail area forward. In this sense the Arabs have a point for argument for their lateen rig.

In a fore-and-aft rig the skipper knows the moment he has sailed too close to the wind by the fact that the sail starts to luff, by flapping at the leading edge. In a lateen rig luffing takes an entirely different form. When sailing close-hauled to the wind in a lateen rig the inclined yard is essentially the mast. When a lateen rig comes too close to the wind, the wind tends to break up the streamlined air flow around the sail by getting behind the leading edge of the sail. When this happens the yard tends to swing forward and produces a flapping in the sail in the very forward tip of the triangle (Plate 16–left).

[47] Fixed ballast should be moved only in the initial balancing. Actually the Arabs carry no fixed ballast.

V

A lateen-rigged craft is a beautiful downwind sailer, running with perfect freedom through the roughest seas. In rough weather the lateen rig has it all over the fore-and-aft rig as a downwind sailer. A fore-and-aft rig may be swamped easily when running downwind in a rough rolling sea. Often it is found necessary actually to tack downwind in a fore-and-aft rig to avoid the dangers of gybing, and take a course that allows the wind to come several points over the quarter opposite the side the sail is on.

A sailor has to be on his toes when sailing a fore-and-aft rig downwind, but this is not the case with the lateen rig, for having evolved from the square rig, it is perfectly suited to downwind sailing. There is no boom near the water and no overhanging sail area, for the sail foot is belayed to the deck on both sides (Plate 16–right), so broaching-to or rolling have little effect on the vessel, except for the discomfort of the crew. In a heavy yaw the yard on a lateen rig tends to slap around, but this may be steadied with the vang. It is virtually impossible to gybe a lateen rig with the sail set athwartships, as the sail simply tends to shift around the mast as the boat moves across the wind; the boat may be efficiently sailed even with the wind coming three points or more over the side the sail is carried on.

When heading downwind from a windward course the tack of the sail should be taken off the bowsprit and belayed amidships. I have sailed a dhow practically downwind with the tack belayed forward on the bowsprit, rather than brought back amidships. With the sail in this position the boat may be easily gybed, as the wind can get in back of the sail when the boat crosses the wind a little. If it does gybe, it will probably break the forward end of the yard and flatten the sail against the mast, staying there until the boat is brought back on its proper course. As was mentioned before, a lateen-rigged dhow sailing downwind with the sail tied down amidships is like a square-rigged sail and cannot be gybed. It can sail from the port tack right across the direction of the wind until it is quartering on the opposite tack; only the sheet and tack lines must be shifted during this maneuver.

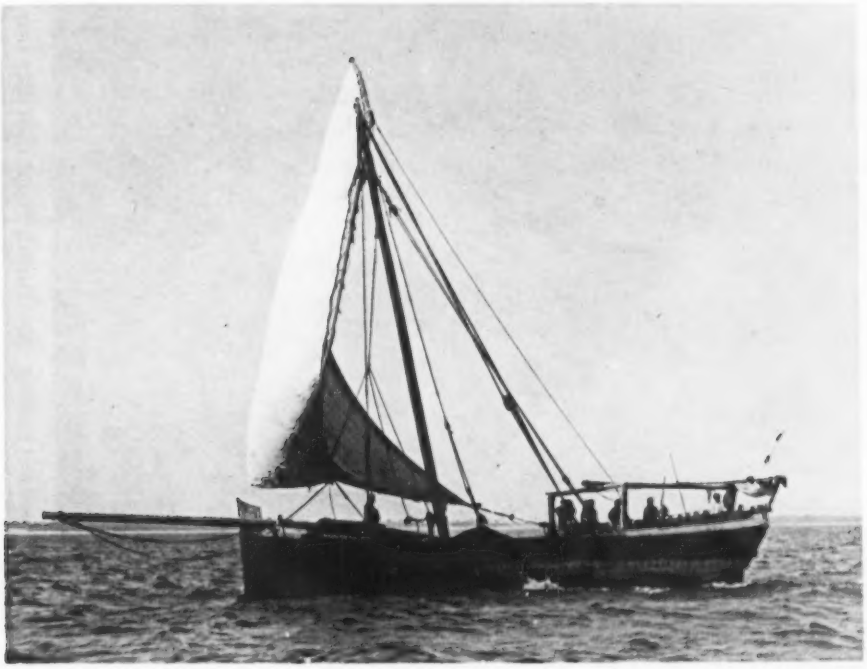
If the sail is left with the tack belayed to the bowsprit while sailing downwind, a certain degree of efficiency is lost as the area presented to the wind is not as great as when the full sail pattern is presented in a square-rigged position. I have noticed a terrific tendency for a dhow quartering downwind to broach-to in rough weather when the tack is

left fastened out on the bowsprit; once I had a rudder break from the strain of this force. This is probably caused by a shift in the position of the boat causing currents to form about the sail so that the resultant force on the sail is almost upwind. A sail in a square-rigged position cannot do this. I have noticed that the Arabs sail their large dhows downwind with the tack hitched out on the bowsprit only when they have been maneuvering for a landing; when cruising they always set the sail square to the wind.

Most Arabs have a loop of rope fastened to the center of the foot of the sail. When sailing downwind they hitch an auxiliary halliard to this loop and haul the center of the sail up far enough so that they can see where they are going (Plates 9–top and 16–right). Without this little refinement the helmsman has to have a lookout to direct his course, as the sail would completely blanket the horizon.

It is while running downwind that the dhow is brought about on the opposite side of the wind (Figure 15; C, D, E, F). The yard on which the sail hangs is in front of the mast. When the wind is dead astern the mainsheet is released and goes snapping forward. Upon releasing the mainsheet, the wind pressure on the long yard acting from dead astern tends to bring the yard into a perfectly vertical position beside the mast, as the boat loses speed. The tack must be free so that the lower end of the yard does not foul. As the helmsman brings the boat across the wind, the sail flaps around in front of the yard, fluttering like a flag unfurling. A man standing forward gives the yard a twist and rolls it on the other side of the mast, belays the tack down on the opposite side, then retrieves the mainsheet and brings it aft to be cleated down again. As soon as the mainsheet is brought back the sail rapidly assumes its shape again. Sometimes during the maneuver the mainsheet is held and passed around the front of the yard if the wind is strong, but is generally allowed to flap and snap of its own accord and it is not an unusual sight to see an Arab frantically grabbing or fishing for the sheet. The sheet snaps around like a whip when free and certainly feels like a whip if it catches you.

If the lateen rig has been sailing downwind the change of sail is slow and effortless, requiring but a change of the sheet and the tack purchase. If the boat has been sailing to windward and wishes to tack, it must lay off, wear around, bring the sail about, and then head upwind on the other tack (Figure 15). But it is not accomplished as easy as it is to say, for the shrouds must be shifted across to the opposite side so they are to windward as the boat goes to windward. This is accomplished as the boat starts downwind and then starts to windward again.



A *jalbhut* sailing down-wind as viewed from abeam. This photograph was taken a few seconds after that reproduced in the upper part of Plate 14. Note the tack purchase arrangement

A heavily laden *jalbhut*. The fundamental rigging is excellently shown—tack purchase, shrouds, backstay [slack], main halliard [in man's hands] and vang [in helmsman's hands]. The fact that the backstay is slack shows that the sail is being lowered

A small dhow luffing, as told by the wrinkled luff of the sail. The craft is probably a *ballam*

A large *jalbhut* sailing downwind. Note that the center of the sail foot is hoisted so that the helmsman can see the horizon

A novice can find himself in plenty of difficulty in the simple act of changing the sail from one tack to the other when going downwind,[48] especially if he is carrying a smaller sail than the craft's full canvas. With a

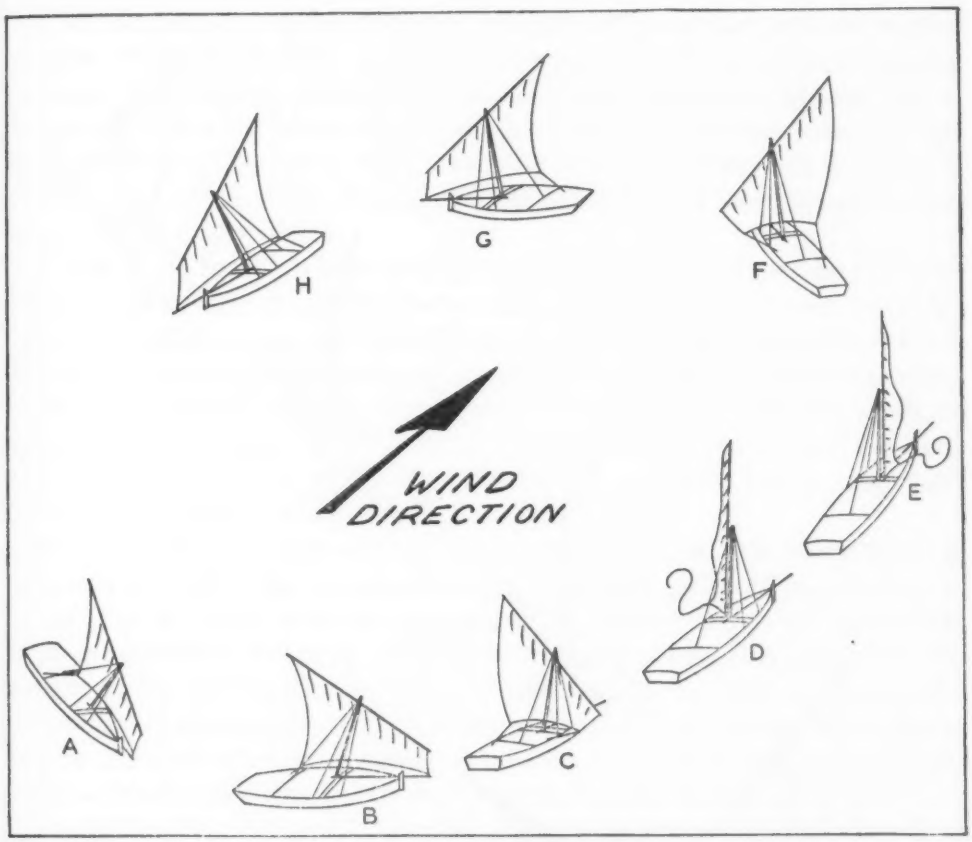


Fig. 15. Wearing Around

A. Close-hauled on the starboard tack. B. Sailing downwind on the starboard tack, with the wind several points abaft the beam. C. Running free on the starboard tack with the wind astern. D. Mainsheet and tack purchase released. E. Sail naturally assuming position on the starboard side as the boat starts on the port tack. F. Running free on the port tack with a quartering wind. G. Broad reach on the port tack. H. Close-hauled on the port tack.

small sail on, the yard is lower on the mast than it is ordinarily. Thus, unless the yard is hoisted before the sail is allowed to fling itself around the mast, the lower end of the yard will hit the gunwale when one attempts to bring it in an upright position (Figure 16). As the boat crosses the wind

[48] L. Dimmock, 'The Lateen Rig,' *Mariner's Mirror*, XXXII (1946), 35, in writing of the sailing characteristics of Persian Gulf dhows, states that 'the first impression noted was that the lateen rig was the most dangerous rig ever devised by the wit of man.'

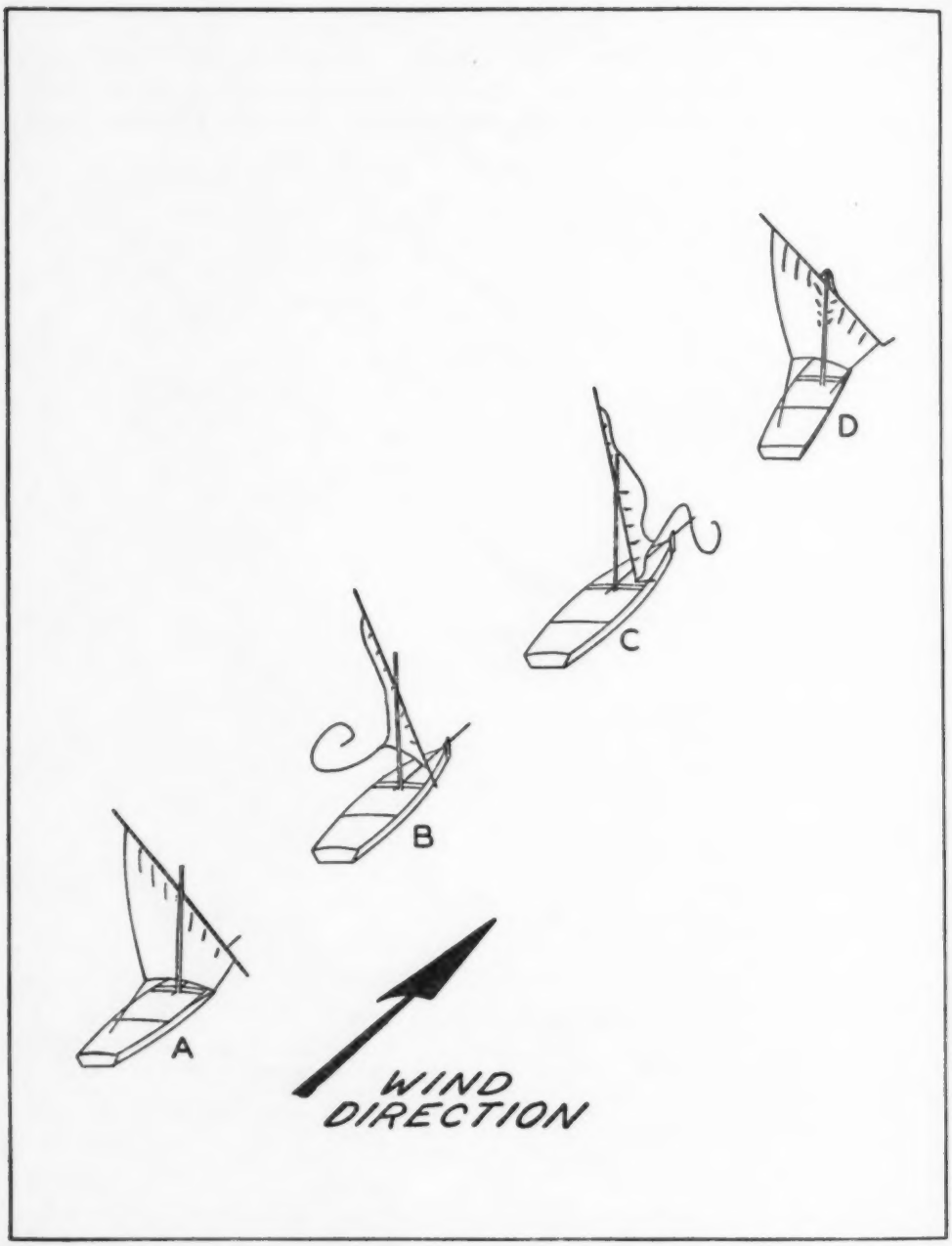


Fig. 16. Wearing Around Improperly

A. Running free on the starboard tack with the wind astern. B. Mainsheet and tack purchase released, but yard not hauled high enough to be righted. C. Sail naturally assuming position on the starboard tack as the end of the yard breaks. D. Running free on the port tack with the sail on the starboard tack and fouled over the masthead.

one realizes only too late that the yard cannot be swung onto the other side. The sail is already on its way and will go whether the yard goes or not. The yard ends up in the same position as before but the sail is fouled over the masthead on the forward side of the mast.

This is a perplexing condition as you cannot hoist the yard any higher because of the fouled sail, you cannot let the yard down without poking the mast and rigging through the sail, and you cannot change the sail as the yard cannot be lifted high enough. There is only one solution—go aloft and unfoul the mess, with a knife if necessary. This can be risky in a small boat under thirty feet, as the weight aloft will tend to capsize the boat if there is any wind.

There is no reason why a small lateen-rigged boat cannot be brought about head-to-wind from the starboard to the port tack (or vice versa) by tacking directly across the wind (Figure 17), but as the Arabs have their dhows constructed with small rudders it is difficult or impossible to bring the boat across the wind if the wind is strong. Besides, the materials of construction are often so weak that a strong wind might break the long slender yard when its whole length with the sail attached is subjected to the head-on force of the wind.

It should be remembered that all forces are against one when tacking to windward. Once the bottom of the sail has been gathered in, the largest effective area of sail is on the top of the yard above the point where the yard is hitched to the mast. The force of the wind on this area plus the weight of the sail tending to pull the yard into its natural inclined position both act against an attempt to bring the yard into a vertical position. In a boat above fifty feet in length these forces would be insurmountable, unless a block were hitched to the lower end of the yard to right it.

I have brought 30-foot dhows with a large rudder about to windward in moderate winds. The sail does not move itself around as nicely as it does in the downwind maneuver and has to be dragged across in front, but the maneuver is nonetheless successful. I have never seen the Arabs use this maneuver on even small boats; they fear its use, for broken yards have probably made their mark on them. The Arabs regard tacking to windward with the same awe that we regard gybing. Moore[49] states that Red Sea craft change tack by wearing instead of tacking, and that he saw only one craft tack (in Massawa Harbor) by putting about head-to-wind and dragging the sail across in front of the righted yard.

On a large ocean-going dhow (*bhum, baghla, ganja,* etc.) it would be out of the question even to think of putting the vessel about head-to-wind by

[49] A. Moore, *Last Days of Sail and Mast* (Oxford: Clarendon Press, 1925), p. 132.

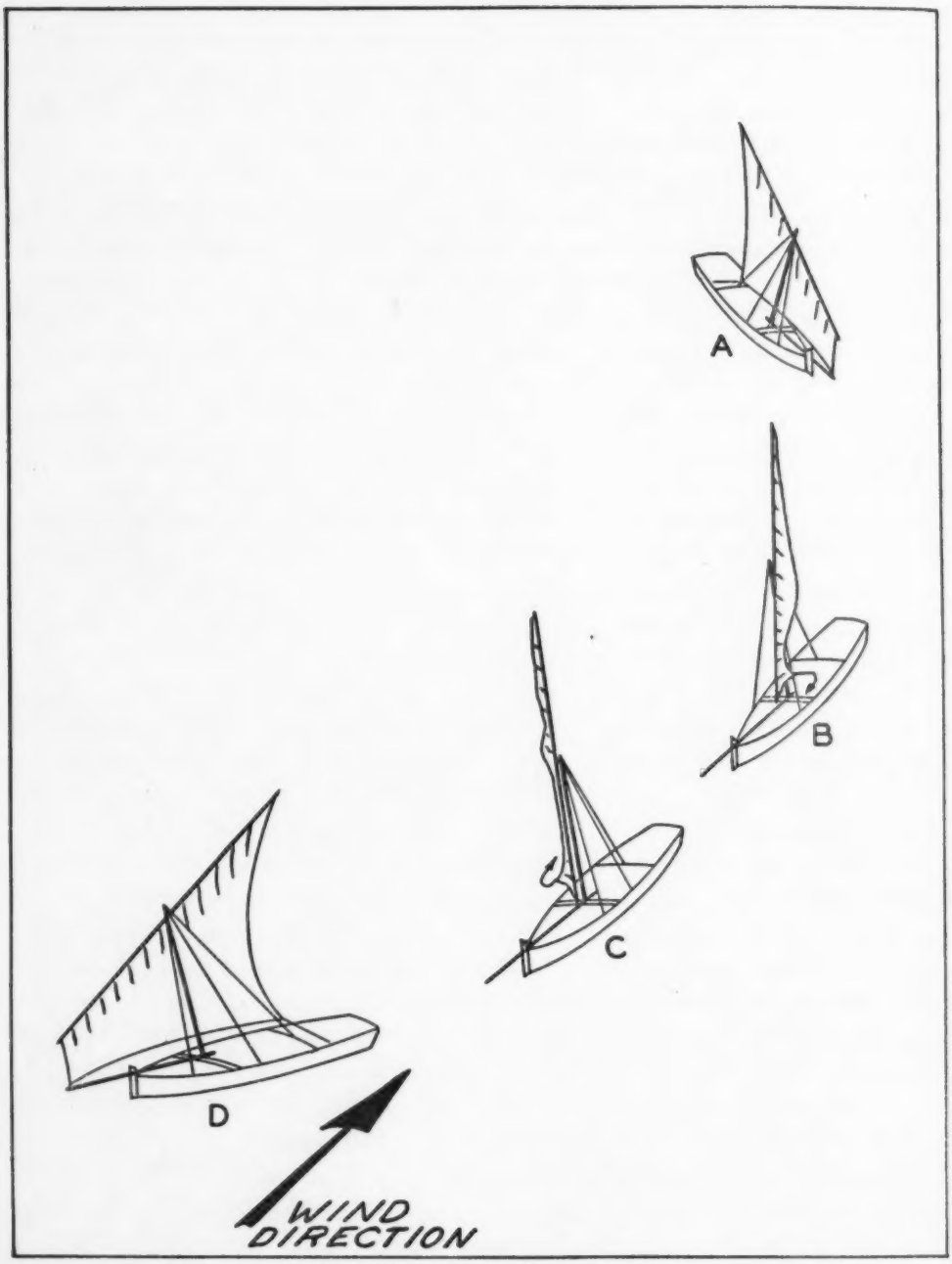


Fig. 17. Tacking

A. Close-hauled on the starboard tack. B. Head-to-wind with the mainsheet being dragged forward of the mast on the port side. (Arrow indicates path of sheet.) C. Head-to-wind with mainsheet being dragged around starboard side of mast and shrouds shifted to port side. D. Close-hauled on port tack.

righting the huge yard and dragging the sail around in front of the yard. A large ocean-going dhow may be put about head-to-wind, though, if the yard is maintained in its inclined position and the sail is simply allowed to back against the mast as the ship moves across the wind. The mizzen is dropped during the maneuver. A large ship is put about in this manner only in case of extreme emergency. Alan Villiers sailed with the Arabs from Zanzibar to Kuwait (well over 4000 miles) on a 120-foot *bhum* and saw it put about head-to-wind only once; the Arab's reluctance to tack with the sail aback can be fully understood from Villiers' description of the maneuver:

> Once we tacked. It was the only time that I saw the big [*bhum*] put about head to wind in all the time I was on board. Hamed would not have done it then had the tide not suddenly turned on him as he was standing very close to weather a low spit of land, jutting out from a place where once a river might have flowed. We were too close; and the ship was being set ashore. There was neither room nor time to wear, for if we had fallen from the wind we should certainly have gone ashore . . . Hamed . . . murmured an order quietly: the quartermaster at the wheel yelled it: all hands sprang to their stations. They all had their stations for wearing ship, and they were the same posts for tacking. Now down came the mizzen on the run. The quartermaster, at a nod from Hamed, who was standing up on the cutter by the davit heads, eased the helm down. She responded at once, putting her long nose into the wind. By that time we were perilously close inshore, right in the shallowing water and watching the shelving sand, just outside the breakers' line. But she came all right. She answered her helm beautifully, and the big lateen sail proved a well-balanced rig. She turned on her heel and carried round with her own way, even when the huge sail was full aback.
>
> This was an awkward moment, for if she gathered sternway she was finished then. She did not. She kept her head and came round handsomely, though the business of handling the backed mainsail and the awkward tripping of the great lateen yard with all the pressure of the wind trying to break it were extremely difficult maneuvers. The mainsail, which like all Arab sails had no gear on it whatever, wrapped itself in huge awkward folds between the yard and the raking mast and did its best to become entangled with all the gear—the mast tackles, the halliards, the shrouds. . . . I feared that the lateen yard must break, for with the sail aback all the pressure of the wind was against it, and the unsupported mast could easily have come down. It was a complicated and exceedingly dangerous piece of seamanship, and nothing but sheer manpower got that great mainsail back under control. It was a piece of canvas 130 feet on the head, with a luff of well over 90 and a foot a hundred feet long. It was well over six thousand square feet of canvas—an enormous sail, as it had to be when it was the main motive power of a ship of 150 tons. I was glad then that we had such a large crew [twenty-eight men], for there was work enough for all of them. Only the fighting spirit of the crew curbed and controlled that fighting, thrashing piece of canvas; and it had to be done carefully, too, lest the weak seams

split, and the ship should be left there in the dangerous situation with her sail unfit for use.[50]

A single-masted shallow-draft dhow cannot be tacked in this manner with the sail aback, as it simply makes sternway, even though it may be pointed several points off the wind. Once the sail is backed and the craft starts making sternway, it is very difficult to get on the other tack, as the rudder has absolutely no effect on the motion of the boat. I had this happen at night once with an Arab crew, when sailing close to the wind and running into a fast moving current coming off a shoal to leeward. The sail started to luff, and then before we knew what happened we were making sternway with the sail aback, much to the confusion and consternation of everyone aboard, especially the Arabs. We ended by letting the sail down and rowing back to our course. The two-masted dhow does not have this difficulty, as the mainsail used alone moves the center of effort of the sail far enough forward to bring the bow about effectively.

In speaking of navigation in the narrow waters or tideways of the Shatt-al-Arab River at the head of the Persian Gulf, Dimmock states:

With two masted [*bhums*] one sail is set on the windward side of the mast, so that both sails are not aback on the same tack. Obviously, in squally weather such a situation is fraught with danger, because the pressure of the sail against the mast and halliard precludes any possibility of lowering the sail in a squall, . . . and this method of tacking is only used when it is unavoidable.[51]

If this peculiar arrangement is only used when unavoidable, it is a mystery to this writer how the Arabs get the vessel initially with one of its two sails aback when needed in a hurry.

In several instances I have seen Arabs drop anchor to get a dhow onto the other tack. This is generally done only when the wind is so strong that they do not dare risk the yard even in the downwind maneuver. This is a back-breaking procedure, for the dozens of lines tying the sail onto the yard have to be undone, the sail has to be dragged around the mast, the yard shifted around the mast, and then the sail bent onto the yard again and hoisted.

Getting the sail on the opposite side of the mast may be the least of your worries, for a combination of the wind and the tide may set the boat just opposite to your proposed course. So you weigh anchor and row the boat around so as to be able to start off on the tack you want. If you do not have any oars you are in a predicament which can be as embarrassing

[50] A. Villiers, *Sons of Sinbad* (New York: Charles Scribner's Sons, 1940), p. 49.
[51] L. Dimmock, 'The Lateen Rig,' *Mariner's Mirror*, XXXII (1946), 40.

as it is frustrating. Your boat is headed on the tack that you were just on, and you have just changed the sail manually to avoid changing it in motion. You could hoist the sail with the sail aback, but you would only make sternway. So all hands go overboard and push the boat to a point where it can start to sail. That certainly seems like the hard way to anyone who has sailed a fore-and-aft rig.

VI

If a round-bottom boat has no centerboard, the best course it can expect to make when close-hauled corresponds to a course somewhere between a close reach and a broad reach. This will probably be somewhere between five and one-half to seven points off the wind instead of the four points possible with a well-balanced centerboard boat. From observations acquired through many hours of sailing native dhows without centerboards, I would say that the best course possible to windward in a dhow without a centerboard is about six and one-half points off the wind. It is thus virtually impossible to make a point to windward in such a boat as the effective angles between tacks would be only three points instead of the theoretically attainable eight points. One is probably wondering, 'Well, why don't they have centerboards or at least leeboards?', and that is a good question. There are several answers and numerous explanations. The Arab's answer to the question is that their fathers never had to use such a thing, so why should they; besides this, they will tell you that it probably would not work. Of more practical consideration is the fact that in a small boat (up to forty feet long) the centerboard well would take up valuable cargo space. Also, due to the way the Arabs construct their boats, the installation of a centerboard well and its successful operation would be an engineering improbability. There is no logical reason why leeboards could not be used. As far as the Arabs are concerned it is easier to just wait for a favorable wind. If asked whether or not the wind will blow, an Arab will answer *inshaallah*.[52]

The Arabs who sail these lateen-rigged dhows realize that they cannot make a point to windward, so they never attempt the task. This does not mean that they do not sail to windward; they sail to windward when their goal is perpendicular to the wind. Few, if any of them, realize that they could attain their destination faster by making broad tacks; to them sailing to windward requires a vessel to be close-hauled, unless they should actually have to lay off on a broad reach to make their point.

In actual practice the Arab has little desire to tack, in our sense of the

[52] Arabic for 'If God is willing.' This is actually the Arab's way of saying 'Who knows,' but he cannot be so indefinite about the future because he knows that God actually knows.

word, in a *jalbhut* (or other shallow-draft dhow). Inasmuch as he has to wait until the wind is at least perpendicular to his course before he sets sail, he sails only on one tack, as the other tack would simply bring him back to his starting point. A steady shift in the wind may make it necessary for the Arab to get on the other tack; then he brings the sail about by one of the maneuvers mentioned above. As a general rule the Arab figures that the best course he can make to windward is perpendicular to the wind; anything better he gains is *backsheesh*.[53] Realizing that he cannot make a point to windward simply means that the Arab assumes that the wind is nonexistent, if it is not blowing from the right direction. A foul wind to him is the same as a calm; so, as time means little to an Arab, he simply waits for the wind.

It is interesting to watch the Arabs sail their centerboardless boats. I have seen the wind blow for several days from the north without a sail being visible; then with a shift in the wind the horizon will become dotted with sails, all springing up to take advantage of a favorable wind. This is a common sight in Tarut Bay where boats from Darin and Dammam attempt to go northerly around Ras Tanura, as the prevailing wind in this region is slightly west of north. I have seen boats anchored off the Ras Tanura peninsula for several days and assumed that they were probably visiting, but with a change in the wind they would all be off.

The Arabs never seem to head up into the wind or release the sail when they are ready to dock; instead, they frantically let the sail down at what they consider the opportune time. I have asked many Arabs why they sail this way, but the question always confuses them. They sail that way because their fathers did, and their fathers before did. They do not consider that there is any other way. At any rate it is not too practical simply to let the wind out of a lateen sail as the foot of the sail snaps and lashes very savagely in any sort of a wind, for there is no boom on the foot of the sail to hold it.

I watched an Arab in a small dhow run amuck upon landing in this manner one day. He was sailing downwind and headed straight for the beach; he had the main halliard in one hand and the tiller in the other. When he got in rather close he released the halliard, but in his urge to drop the sail as fast as possible, he only succeeded in fouling the halliard in the top block. After several jerks on the halliard he abandoned it and made a dive for the mainsheet, which he released. Upon releasing the sheet the yard lifted majestically to a vertical position with the sail flapping forward (Figure 15D). At about this time the boat hit the beach;

[53] Arabic for 'tip,' 'gift,' 'gratuity.' This is the first word that the visitor to the Middle East hears, for it is on the lips of every beggar.

the top of the yard bent forward, then snapped cleanly at the mast pitching the debris forward like an old umbrella. So intent had that Arab been upon letting the sail down as he hit the beach that it never occurred to him to head up into the wind and unfoul his gear. For some time after he just stood looking at his handiwork as if in a trance. Allah had let him down!

A physical obstacle to sailing in the Persian Gulf waters around Ras Tanura is the strong tidal current. After the tide starts to ebb, the water empties out of Tarut Bay and flows south around the Ras Tanura peninsula and north up the coast. This lasts only about two hours before the north-flowing current on the Gulf side reverses and begins to flow south. The water continues to ebb out of Tarut Bay and flows on south, producing at times treacherous eddies and currents off the end of the Ras Tanura peninsula. As the tide reaches its low point and finally starts to flood, the south-flowing current on the Persian Gulf side simply flows around the end of the peninsula and into Tarut Bay; this does not change during the flood period.

The over-all picture presents a current which flows south on the Persian Gulf side of the Ras Tanura peninsula for ten out of the twelve hours during a tide change; this current is at times strong, being listed on hydrographic charts as having a maximum of from four to five knots. The natives have the greatest respect for this curious tidal movement and watch it very much the way they do the wind; when going north around the Ras Tanura peninsula from Qatif, Darin, or Dammam, they generally wait for the tide to ebb; sometimes they start out from Qatif, Darin, and Dammam to sail around the Ras Tanura peninsula without stopping. But however they do it, they manage to hit the end of the peninsula at just about the time the tide starts to ebb. Usually the boats are going fishing about ten miles north of Ras Tanura where the fishing grounds are excellent.

If there is a fair wind blowing, dhows start out from Darin much like a fleet of racing sloops starting out on a race. So striking are these boats grouped in their dash around the peninsula all sailing the same course, that many American sailors on ships at anchor off Ras Tanura have asked whether they were racing. If they lose their wind and do not get around the peninsula on time, they start rowing frantically with their sweeps—poles with little square boards nailed on the ends. It is not uncommon on a still morning to see half a dozen or a dozen boats come by the end of the East Pier, Ras Tanura, with their sails up to catch any small chance breath, all rowing like doomed men to help the current get them in the

clear. The north-flowing current has a maximum velocity of about two knots. The effect of the current must diminish several miles north, for after the current has changed off the tip of the peninsula the boats gradually fade out of sight farther north.

Anytime you watch the Arabs sail you realize that they sail constantly by trial and error. Once I watched a small 25-foot dhow take off from the West Pier, Ras Tanura, to windward; they hoisted the sail about two-thirds of the way, then shoved out the bowsprit. Then two of the three-man crew layed to the main halliard and hoisted the sail, leaving the rudder to itself. The tiller went slightly to windward and stayed there, the boat being balanced on a close haul. Even with a fair tide they were making plenty of leeway. They started from the Customhouse and after about five minutes dropped sail in front of the West Pier; apparently their destination was to windward, so they started rowing. Thus at times even the Arabs refuse to admit that they cannot sail to windward, and have to have it proved to them by actuality.

Another time I saw a large single-masted 50-foot dhow take out of the relatively sheltered area behind the West Pier and point to windward. As the boat started out from the water which was sheltered from the outflowing tide, it started on its way north; as it hit the south-flowing tidal current off the end of the pier, it started very slowly on a course that was exactly perpendicular to the direction in which it was headed. After about ten minutes the boat had moved only a few hundred yards, directly sideways. Apparently not expecting this, the crew dropped anchor, changed the sail manually, and started on the other tack. In another twenty minutes they were right back where they had started from. Here again the Arabs had to have proved to them what common sense should have told them!

The Arabs who sail the shallow-draft *jalbhuts, ballams,* and *shewes* of the western Persian Gulf waters may not be the best sailors in the world, and certainly are not the equal of their brothers sailing the great ocean-going dhows, but they know their craft and its limitations. The currents may sometimes fool them, if they do not happen to realize what phase the tide is in, but this is to be expected in a land where navigation charts and tide tables are nonexistent. Considering that the Arabs frequently sail their small dhows out of sight of land without charts, compasses, barometers, chronometers, or navigation instruments, it is amazing that they manage as well as they do. The explanation is simple—the Arab has absolute faith—*inshaallah!*

A Sea of Troubles:
The Voyage of Bonetta, *1718*

BY BYRON FAIRCHILD

DURING the winter of 1717-1718 Messrs. William Pepperrell, 'Merchants at Piscataqua,' loaded one of their vessels, the 'pink' *Bonetta,* for what was intended to be a typical, quite ordinary run to Barbados and return. The subsequent voyage, as revealed in the accounts and correspondence of the Pepperrells, presents an interesting close-up of colonial maritime enterprise.[1]

Overshadowed by Boston's pre-eminent position, the early maritime history of the New England outports has to a considerable extent been neglected. Yet each had an important history of its own, distinct from that of the metropolis on Massachusetts Bay. That of the Piscataqua River ports, some fifty miles northeast of Boston, was based on the export of masts destined for the Royal Navy and on the direct exchange of two widely acceptable staples—lumber and fish—in return, mostly, for the rum and molasses of the West Indies. From their earliest days, Portsmouth and New Castle on the New Hampshire side of the river's mouth and Kittery on the other had enjoyed a trade with Barbados and her Caribbean neighbors. In the years that followed, Piscataqua sloops and brigantines participated in the thriving Newfoundland trade or ran with the westerly winds across the North Atlantic to Spain, Portugal, and the Wine Islands. Voyaging southward they scraped their keels across the sand-shoaled approaches of Albemarle Sound or joined with other interlopers on the Campeachy coast. By 1713 maritime enterprise had produced at Piscataqua a group of merchant-shipowners unsurpassed in New England by any but a few of the most well-to-do Bostonians.[2]

[1] Most of the material on which this article is based is located in the well-rounded collection of Pepperrell Papers owned by the Maine Historical Society, Portland, Maine (cited hereafter as MeHS). Other major Pepperrell collections are to be found at the Massachusetts Historical Society and the New England Historic Genealogical Society, both of Boston.

[2] The most important published works dealing with the early trade of Piscataqua are W. G. Saltonstall, *Ports of Piscataqua* (Cambridge, 1941), chapters 2-4, and R. G. Albion, *Forests and Sea Power* (Cambridge, 1926), chapter 6.

Colonel William Pepperrell, friend and business associate of Andrew and Jonathon Belcher, the Tylers, and the Waldos of Boston, and of John Usher of New Hampshire, was at this time the outstanding merchant-shipowner of Kittery. Emigrating from Devonshire in the 1670's he had made his start in the Isles of Shoals fisheries. After a few years he moved to the mainland, married the daughter of a prominent shipwright of Kittery Point, and set himself up as a Newfoundland trader. He soon branched out to the West Indies, North Carolina, and Virginia, and to Spain and Portugal. His trade prospered. During Queen Anne's War he added eight or nine vessels to the seven he had previously owned and in the following decade he added at least fifteen more vessels—six brigantines, eight sloops, and the 'pink' *Bonetta*—to his fleet.[3] Well along in years, and in comfortable circumstances, he might have retired from active business in 1713 had his eldest son, Andrew, lived; but Andrew's death at that time left the burden of affairs resting on the shoulders of Colonel William and his only surviving son, seventeen-year-old William, junior, who, as Sir William Pepperrell, Baronet, is remembered as the conqueror of Louisbourg in 1745. However, until the mid-1720's the elder William Pepperrell seems to have been responsible for the management of most of their overseas trade.[4]

Of *Bonetta's* previous career only one incident has survived. In the late spring of 1717—so testifies a deposition in the New Hampshire provincial records—the pink *Bonetta,* homeward-bound from Barbados, was waylaid off the Chesapeake Capes by a 20-gun pirate ship named *Le Grand.* According to John Frost, master of *Bonetta,* the pirate stripped her of some forty hogsheads of rum, a hogshead and several barrels of sugar, and 'a negro man, together with other goods,' and 'very much damnafyed the ship, sails and rigging.'[5] Although the ownership of the pink was not given in Captain Frost's deposition, it was without any doubt the same *Bonetta* whose voyage the following year was a source of so much concern to the Pepperrells, and of which vessel John Frost, a son-in-law of the elder William Pepperrell, was part owner.

On a day in early February 1718 *Bonetta,* her pirate-inflicted damage apparently repaired, dropped down river from Pepperrell Cove and stood

[3] These include only vessels mentioned specifically in the Pepperrells' accounts and correspondence, and of which William Pepperrell was controlling owner. A number of others referred to in the sources cannot be positively identified. Like other merchants, William must have had a minor interest in a good many more vessels than those indicated above.

[4] Usher Parsons, *Life of Sir William Pepperrell* (3rd ed., Boston, 1856) briefly sketches the careers of the two Pepperrells without much regard for their mercantile activities.

[5] Saltonstall, op. cit., p. 27.

out the harbor, her course set for the West Indies.[6] In charge was a master whose very name smacked of salt, Captain Edward Clampitt. Her cargo was a typical Pepperrell lading: 77,739 feet of pine boards, joists and plank; 14,700 red oak hogshead staves and 950 barrel staves; 29,500 shingles; 1,400 hogshead hoops; and 6 hogsheads of dried fish. Half the cargo went 'on the account and risque' of William Pepperrell and one-sixteenth was shipped on John Frost's account. The remaining seven-sixteenths went on the account of Henry Hole, a Barbados merchant who had recently succeeded his father as the Pepperrells' 'correspondent' and to whom the entire lading was consigned.[7] As was customary in such cases, no freight was charged on the bill of lading, since the shippers of the cargo were likewise owners of the vessel.

In the days of sail, prevailing winds rather than principles of trigonometry determined a vessel's course. For other Piscataqua vessels, and *Bonetta* was probably no exception, the first leg of the voyage to the Antilles was a long, broad reach off the New England coast to a point seven or eight hundred miles in mid-ocean, where the westerlies give way to the squalls and calms and shifting winds of the Horse Latitudes. Then with luck and perhaps ten degrees of southing *Bonetta* could take the Northeast Trades on her port quarter and bear down for the island of Barbados.[8] Thus, after a voyage of some four or five weeks, a voyage of not unusual length, *Bonetta* arrived at the island on 12 March.[9]

In accordance with his instructions, Captain Clampitt upon his arrival informed Henry Hole that another cargo for *Bonetta* was being assembled at Piscataqua, and that Colonel Pepperrell wanted her unloaded and sent back with all possible dispatch. Colonel William's intentions were for *Bonetta* to return home either direct from Barbados or by way of Salt Tortuga in order to take on a lumber cargo for England: in all probability the cargo of deal boards and building timbers that he wrote Roger Prowse of Exeter he was sending aboard a 'small vessel.'[10] Henry Hole, part owner of *Bonetta,* had other plans however. Sugars then commanded 'topping' prices in England, according to the Pepperrells' London factor, and Hole wanted either to load the vessel for London or to sell her in Bar-

[6] All dates falling between 1 January–25 March are herein given as the calendar year.

[7] Bill of lading covering the cargo of pink *Bonetta,* dated Piscataqua, 3 February 1718, MeHS, Book 2.

[8] Captain Enoch Mittlebury to William Pepperrell, Barbados, 25 March 1721, MeHS, Book 1; John Sherburne's log of a voyage to Barbados and London in the ship *Charming Betty,* 1730, Peabody Museum, Salem.

[9] Captain Edward Clampitt to William Pepperrell, Barbados, 18 March 1718, MeHS, Book 2.

[10] Clampitt to Pepperrell, cited in note 9; Roger Prowse to William Pepperrell, Exeter, 15 July 1718, MeHS, Book 2.

bados and lay out the proceeds in a sugar cargo. He had, he told Captain Clampitt, received instructions from the Pepperrells to do what he liked with *Bonetta,* but he could not decide what to do, he further told the captain, until the vessel had completed discharge. In any case the prospect of making a quick turn-around was gloomy. The work of unloading the lumber began on 17 March, five days after *Bonetta* arrived, and at the end of the day two thousand feet of boards had been discharged, half of which were sold immediately. 'Dispatch is liking to be very long,' Captain Clampitt wrote to William Pepperrell. 'Our cargo is going to be retailed out, which will be very tedious.'[11]

So far as prices were concerned the market was better than that sometimes encountered in Barbados by other Pepperrell shipmasters. In 1714, boards and joists out of the Pepperrells' brigantine *Mary* had sold for £4. 10 a thousand; staves had fetched £4, shingles 22*s.* 6*d.*; and fish sold for 16*s.* 3*d.* and 17*s.* 6*d.* per quintal.[12] The master of another Pepperrell vessel, arriving at Barbados on 12 March 1717, just a year to the very day before the date of *Bonetta's* arrival, reported that he had 'come to a very low market,' with boards and joists selling for £4, staves £3 or £3 .4, and that as a result he would be obliged to go down to the Leeward Islands and try to sell his cargo at Antigua or one of the other islands.[13] In 1721, boards and joists from the sloop *Molly's* cargo brought £4 .5 per thousand, staves only £2, shingles 10*s.*; while the sales price of her fish ranged from 12*s.* per quintal for scale fish (hake, haddock, and pollock) to 13*s.* 6*d.* for cod.[14] *Bonetta's* cargo went at considerably higher prices than these. Ten weeks after *Bonetta* had begun discharging her lumber Captain Clampitt was able to write Colonel Pepperrell that the joists had fetched £7 a thousand, the boards £6 and the staves £4. Her shingles had brought in 22*s.* 6*d.* a thousand, and fish was selling for 20*s.* per quintal.[15] On this basis, therefore, William Pepperrell's half share of the cargo grossed approximately £322.

Nevertheless Captain Clampitt could take but small comfort from his circumstances of the moment, and towards the end of May he sent a long, very depressed letter to William Pepperrell. He had been waiting two months, he wrote, while Henry Hole tried with no success to sell *Bonetta.* Hole had been offered £1,000, Barbados currency, but the gentleman who

11 Elias Pearse to Messrs. William Pepperrell, London, 22 October 1718, MeHS, Book 1; Clampitt to Pepperrell, cited in note 9.

12 Accounts of the brigantine *Mary,* 1714, MeHS, Book 1.

13 Captain William Knowles to William Pepperrell, Barbados, 14 March 1717, MeHS, Book 2.

14 Accounts of the sloop *Molly,* 1721, MeHS, Book 1.

15 Captain Edward Clampitt to William Pepperrell, Barbados, 25 May 1718, MeHS, Book 1.

proposed to buy the pink took sick and went to Bermuda 'for a change of air.' If only Colonel Pepperrell's instructions had been 'a little more intelligible,' wished the captain, or that he had heard from the colonel after his arrival: for Henry Hole was now putting on board a cargo for London without letting him know to whom it was consigned or what Colonel Pepperrell's intentions were in the matter. Furthermore, only thirteen hogsheads of sugar had been loaded so far, and no information had been given Captain Clampitt to indicate when more cargo would be forthcoming. 'I was never so weary of any place in my life . . . ,' he finally complained.[16]

Crew trouble aggravated the captain's worries and weariness. *Bonetta* had not been in Barbados a week when one of the men 'ran,' or jumped ship as this less sedate age of today calls it. Two weeks later another seaman, possibly two of them, left the vessel. Then on the night of 5 April a seaman took the 'canoe' to go aboard a Bristol ship and nothing was seen of him or the canoe afterward. He had probably drowned, Captain Clampitt thought, and the canoe gone out to sea.[17]

Later on, when the men learned that *Bonetta* was bound for London, further trouble developed. Whether seamen were hired under oral agreement or whether they signed articles, the terms of their employment constituted a definite and special contractual relationship from which any departure was quickly challenged by either party. In the matter of wages and deviation from the stipulated voyage, which were common points at issue, the men were in general well aware of their rights and were, more often than not, given sympathetic hearing in colonial courts.[18] The crew of *Bonetta* had apparently been shipped at Piscataqua for a voyage to the West Indies and return, according to William Pepperrell's original intention. Their wages, apart from the customary advances and deductions, were due at the completion of the voyage—namely upon their return to Piscataqua. Diverting the vessel to London was a breach of contract, the man claimed; and they refused to stir out of Barbados until Captain Clampitt and Henry Hole promised them they would be paid at London in sterling, which had the effect of giving them a wage increase of approximately fifty per cent.[19]

On receiving the captain's doleful letter of 25 May Colonel Pepperrell

[16] Clampitt to Pepperrell, cited in note 15.

[17] Clampitt to Pepperrell, cited in note 9; Clampitt to Pepperrell, cited in note 15.

[18] R. B. Morris, *Government and Labor in Early America* (New York, 1946), chapter 5, particularly pp. 230-246.

[19] Elias Pearse to William Pepperrell, London, 26 January 1719, MeHS, Book 1.

wrote to Clampitt in no uncertain terms that the voyage to London was contrary to orders. But, he continued, since the pink was now bound there it was his desire that she should be sold in England and that his half share of the proceeds, as well as his half of the cargo and freight, be turned over to Elias Pearse, a London merchant who was one of the English correspondents of the Pepperrells. On other occasions when it appeared likely that a captain could find a good market for the sale of his vessel the Pepperrells were careful to enjoin upon the master the responsibility of obtaining passage home for himself and the crew.[20] As for *Bonetta's* crew, however, there were only two men in whose return Colonel Pepperrell seemed to show any great interest. One of them, Thomas Pridix, was a young Devonshire kinsman of Colonel William's; and the other, Isaac Watts, was apparently an apprentice of the Pepperrells. 'Take care of Isaac Watts,' William wrote to Captain Clampitt, 'and send him by the way of Newfoundland if you cannot send him directly here.' Pridix was to be given Colonel William's 'love' and £5 'to clothe himself' on his arrival at London, and he could if he wished go to visit his friends. Neither Watts nor Pridix was to receive his wages; instead Colonel Pepperrell was to be credited with the amount. Then the colonel ended his letter to Clampitt with the offer he frequently made to a captain whose vessel was to be sold. 'If you are willing to come to sail out of these parts, I will,' he promised, 'be concerned in a good vessel for you.'[21]

By the end of July or early August *Bonetta* was at last ready to sail for England. Then she sprung a leak, 'by neglect of the caulker' according to Henry Hole. Her cargo—some 150 hogsheads of sugar and 30 tons of 'wood'—had to be taken out, the leak patched up, her goods reloaded, and thus another six weeks or so went by before Captain Clampitt's sojourn at Barbados finally came to an end.[22]

On 12 November, nine months out of Piscataqua, *Bonetta* made her way up the Thames to her moorings at one of the London docks. In the meantime William Pepperrell seems to have grown uneasy as the weeks passed without word of the vessel, for on 9 October he had written to Elias Pearse of London ordering £500 insurance on *Bonetta;* and either in ignorance of the wage agreement reached in Barbados or in hope of setting it aside, he instructed Pearse to pay the men the sterling equivalent of their wages computed in New England currency. The letter did

[20] William Pepperrell to Captain Pelletiah Whittemore, Piscataqua, 25 May 1734, Wildes Papers, Kittery, Maine; William Pepperrell to Captain Enoch Mittlebury, Piscataqua, 10 February 1721, MeHS, Book 2.

[21] William Pepperrell to Captain Edward Clampitt, Piscataqua, 3 July 1718, MeHS, Book 2.

[22] Pearse to Messrs. Pepperrell, cited in note 11.

not reach Pearse until five days after *Bonetta* arrived, when the insurance was of course no longer needed. It was not too late, however, to provoke another labor crisis. Pearse's account of his difficulties with the men, if stripped of its antiquated turn of phrase, might well have been written by the port agent of a present-day steamship company. He wrote thus to Colonel Pepperrell:[28]

> As to what you writt in relation to paying the men's wages with allowance for the difference between New England and sterling money, I proposed it to them; but they were surprised at your proposal. They owned they were shipped in New England to go to Barbados and thence back again, where [they] were to have received their wages, and they should not have expected it otherwise. But at Barbados the voyage was altered, and they would not have proceeded for London had not the Captain and Mr. Hole promised them they should be paid in sterling; which if they had not, all would have left her. So as it was a new contract I could not insist otherwise, and indeed when freight is due the wages is, be it in what country it will, and indeed I was much afraid I should have trouble with them too; for the day before the ship was to be sold they came to demand their wages for that they lay at charge. I told them as yet the goods was but just delivered, and we had received no freight, neither knew if any freighter demanded plunderage . . . ; but somebody had put it into their heads that if the ship were sold before they were paid they could not arrest the ship for it afterwards. I endeavored to convince them the contrary, but could not; and would fain have put them off to the next week. But they grumbled, and I considered with the Captain that if they should come at the sale and make any noise there it might prejudice the sale. Although I had not received any money yet, I appointed them to come the next morning and they should be paid, which was accordingly done. . . .

As might be expected Thomas Pridix 'grumbled' at considerable length when he learned he was to receive only £5. He was no apprentice, he told Pearse, to be treated in such fashion; but even with Captain Clampitt's encouragement he could persuade Pearse to let him have only forty shillings more.

When it came to selling *Bonetta,* Pearse had troubles enough without the presence of a group of disgruntled mariners who might have prejudiced a would-be buyer. The vessel was put up at auction on 10 December at £400; but no bidders came forward so it was decided to postpone the auction a week or so, particularly as there was to be a sale of some other ships in the meantime. At the next attempt Pearse prevailed upon a Colonel Vaughan and one Captain Wentworth, undoubtedly neighbors of the Pepperrells at Piscataqua, to attend the auction for the purpose of throwing in some fictitious bidding. But again no actual bidders appeared, and again the auction was postponed—until after the Christmas

[28] Pearse to Pepperrell, cited in note 19.

holidays. Meanwhile, Pearse and Captain Clampitt placed *Bonetta* in the hands of a broker, and a day or two later Pearse accepted an offer of £450, though it was at least £300 less than Henry Hole had expected the vessel to fetch in England. Although the man who made the offer gave the broker a guinea 'earnest' he was so 'very backward' that Pearse was afraid he could not be held to his bargain. However, toward the end of January Pearse managed to collect £100 from him and agreed to give him a month in which to pay the rest. 'But he shall not have a bill of sale,' Pearse assured William Pepperell, 'nor carry the ship out of the river till he pays the whole, though [I] let him work on her.'[24] In this concession perhaps lies a clue to *Bonetta's* state of seaworthiness and to the difficulty Pearse had selling her.

As for the revenue *Bonetta* earned from Barbados to London, Pearse reported that it came to £292 .10 .6, 'net freight,' of which the Pepperrells' half share amounted to £146 .5 .3. Her cargo had consisted of 146 hogsheads, 16 tierces and 12 barrels of sugar, and 95 tons of wood. It was not a full cargo 'by a great deal,' Pearse wrote. The ten hogsheads shipped on the account of *Bonetta's* owners sold at forty-one shillings per hundredweight, which was a higher price by seven shillings, but a lower margin of profit, than Pearse received for the sixty hogsheads of coarse sugar shipped on his account. Since sugars averaged about 1,245 pounds to a hogshead the Pepperrells' share of the proceeds came to approximately £114. Thus they received from freight earnings, from the sale of their sugar, and from the sale of the vessel a total of about £485 before Pearse's commission, port charges, customs duties, haulage, and similar charges were deducted. Pearse was apologetic, however, for sugar prices had been slipping rapidly downward. 'Mr. Hole's keeping the ship so long with our sugar on board was a great loss . . . ,' he wrote to William Pepperrell, 'but we must have patience . . . and I wish you better success for the future.'[25]

In the years that followed, the Pepperrells saw some of their ventures come to even less successful endings, but in general fair winds favored them. By the time the elder William died, in 1734, they were conceded a place among the 'superior sort,' even by well-to-do Boston merchants. The appointment of William, junior, to a seat at the govenor's Council, where he served for thirty-two consecutive years, from 1727 until his death in 1759, was tangible evidence of their social and financial standing.

Several of the men involved in the affairs of *Bonetta* continued to be

[24] Pearse to Pepperrell, cited in note 19; Pearse to Pepperrell, cited in note 11.

[25] Pearse to Pepperrell, cited in note 19.

identified with the mercantile activities of the Pepperrells. Unlike the majority of the shipmasters in their employ, Captain Clampitt does not appear to have been a Piscataqua man; but he returned and commanded Pepperrell vessels for another ten years before he dropped out of sight. Mindful of William Pepperrell's instructions Captain Clampitt, before leaving England, sent 'the boy,' Isaac Watts, down to Devon to take passage in a New England-bound vessel. Presumably Thomas Pridix returned to the Pepperrells in spite of his dissatisfaction, for by 1725 he had risen to command their sloop *Sarah*.[26] Likewise, Elias Pearse continued as their London correspondent until his death in 1724 or 1725, when he was succeeded by a prominent London factor, Silas Hooper.[27] Henry Hole's association with the Pepperrells did not, however, long outlast the voyage. When the Pepperrells sent their brigantine *William and Dorothy* to Barbados in late May 1718, Hole was passed by in favor of a 'trading' voyage. And again in November of the following year Captain Clampitt, now master of the sloop *Prosperous*, was dispatched to Barbados with instructions not only to dispose of his cargo and arrange for his return lading himself, but to settle the Pepperrells' accounts with Mr. Henry Hole.[28] In the meantime the Pepperrells had established other commercial connections on the island and Hole never again appeared in their affairs.

The voyage of *Bonetta* was unusual in two respects: most of the Pepperrells' West Indies trade shuttled back and forth between Piscataqua and the islands, and in general their relations with their overseas correspondents ran much more smoothly than the course of their dealings with Hole in this particular instance. With these exceptions, and for some merchants they could not be considered such, *Bonetta's* voyage clearly illustrates the mechanisms and some of the normal hazards of the Pepperrells' trade. Although the story of her voyage is no more than a small detail from the vast mosaic of colonial maritime enterprise, unless the details are filled in the whole pattern will remain blurred and indistinct.

[26] Messrs. William Pepperrell, Account current with Thomas Kerby, Antigua, 8 October 1725, MeHS, Book 1.

[27] Silas Hooper to William Pepperrell, London, 5 June 1725, MeHS, Book 2.

[28] William Pepperrell to Captain William Knowles, Piscataqua, 22 May 1718, Harvard University, Houghton Library MS. Colls.; William Pepperrell to Captain Edward Clampitt, Piscataqua, 14 November 1719, MeHS, Book 2.

New Light on the Evolution of the Chesapeake Clipper-Schooner

BY ARTHUR PIERCE MIDDLETON

THE most spectacular event in the history of ship design in the eighteenth century was the emergence of the Chesapeake Bay clipper-schooner, which became famous during the American Revolution as the 'Virginia-built schooner' and at the peak of its development during the War of 1812 as the 'Baltimore clipper.'[1] This fast, weatherly vessel, characterized by smooth underbody, considerable deadrise, deep drag of keel aft, low freeboard, and sharply raked masts, was the finest product of American marine architecture during the colonial period. Before the end of the eighteenth century its reputation for speed, maneuverability, and beauty was international.

Had it not been for the Revolution, the clipper-schooner might have remained a local Chesapeake type for many decades, its light hidden under a bushel. But the advent of the war, just as the vessel reached the mature stage of its development, brought it to the attention of several European nations. Moreover, the maritime aspects of the Revolution, by creating a demand for this type of vessel, impelled builders all along the coast, north as well as south, to turn out vessels on clipper lines. And in this way the Chesapeake clipper very soon became a national type.[2]

In view of the importance of the clipper-schooner, its origin has been the subject of considerable interest. It is reasonably certain that it evolved in Chesapeake Bay sometime around the middle of the eighteenth century and that it was brought into existence to meet the needs of pilot boats, privateering, and trade to the West Indies. The date of its first appearance is not known with certainty, and perhaps will never be known. The type did not spring into existence fully-formed, like Athena from the brain of Zeus, but developed gradually over a period of years. What

[1] The word 'clipper,' from the archaic verb 'to clip,' meaning to move the wings rapidly or to fly rapidly, was applied to fast horses and, later, to fast-sailing vessels. In early nineteenth-century usage, 'clipper' was understood to apply to the sharp, raking American schooners. After the middle of the century, the term was appropriated to the sharp, heavily-canvassed ships and barks of the 'clipper ship era.' See *Oxford English Dictionary*.

[2] Howard I. Chapelle, *The Baltimore Clipper* (Salem, 1930), pp. 35-36.

it started from, what models influenced it, are matters of conjecture dear to the heart of maritime historians.

There are four distinct theories concerning its origin. The Bermudian theory, by far the most plausible, attributes the inspiration of the clipper, especially its hull design, to the small, fast-sailing Bermuda sloops that frequently traded to Chesapeake Bay in the eighteenth century.[3] These sloops were remarkably similar to clippers: both had raking stern and stem-posts, low freeboard, raking masts, and considerable dead-rise. The French theory ascribes the design of the clipper to French models, particularly the fast French luggers which were in American waters during the Revolution, and which had a certain similarity to the Chesapeake clipper.[4] The Swedish theory, based on typological similitude and on proximity of early Swedish settlements on the Delaware to Chesapeake Bay, postulates the influence of certain fishing craft used by the Swedes upon the clipper-schooner's lines.[5] The Mediterranean theory, also based on typological evidence, attributes the lines of the clipper-schooner to the presence of Mediterranean xebecs or galleys.[6]

The Swedish and Mediterranean hypotheses, while not altogether impossible, are highly improbable. In the early days before the Swedes were inundated by the rising tide of British and German settlers, there was little maritime intercourse between the Chesapeake and the Delaware. The Mediterranean theory likewise is without historical evidence to support it. The Spaniards built a number of xebecs for service in the Caribbean and it is possible, in fact probable, that Chesapeake vessels trading in the West Indies occasionally saw them.[7] However, there is a vast difference between seeing a vessel at sea and building vessels modelled on its underwater lines! There is no historical evidence that Swedish vessels or

[3] The Bermuda sloop of the eighteenth century was derived from the Jamaica sloop of the previous century. They had square topsails, long bowsprits, and loose-footed mainsails, and were popular with pirates, privateersmen, and smugglers. Because of its fine timber—especially its good grade of cedar—and the skill of its inhabitants, Bermuda became the principal builder of 'Jamaica sloops.' Before the middle of the eighteenth century, the name became 'Bermuda sloop.' The latter, however, was merely a slightly improved Jamaica sloop and not, as the different name suggests, a distinct type. See ibid., p. 9.

[4] Ibid., pp. 4-8. The plan of *Le Coureur*, which was on the American coast during the Revolution, shows a fast, powerful vessel with slightly raking ends, great dead-rise, and sharp waterlines.

[5] Ibid., p. 8.

[6] A xebec, or xebecque, was a small, fast, Mediterranean vessel that had two or three masts, the foremast raking well forward, and that was commonly lateen-rigged, but carried some square sails. The *Oxford English Dictionary* cites references to them as early as 1756. William Falconer, *An Universal Dictionary of the Marine* (London, 1780), states that the hull is peculiar, 'the extremity of the stern . . . projects further behind the counter and buttock than that of any European ship.' See also B. Glanvill Corney, 'The Xebec,' *The Mariner's Mirror*, I (1911), 173-177.

[7] *Maryland Gazette*, 29 April 1746. A flag-of-truce sloop returning to Charleston, S. C., from Havana reported 'that two Spanish Xebeques, each of them of 10 Guns and 150 Men, being on a Cruize off Point Piedro, on the South Side of Jamaica, met with his Majesty's Snow the Blast . . . whom they took after a bloody Engagement of 4 Hours.'

Mediterranean xebecs were in the Chesapeake before the Revolution.[8] In view of the fact that the type of vessel that influenced the clipper-schooner was probably in Chesapeake waters more or less continually during the period of the latter's evolution, the Swedish and Mediterranean theories may safely be rejected.

The same objection is not applicable to the French and Bermuda theories, as there is ample evidence that French-built and Bermuda-built vessels frequented the Bay during the half century prior to the Revolution during which the clipper-schooner was evolved. Although French luggers may not have entered the Chesapeake before the Revolution, many French vessels taken during the four Anglo-French wars between 1689 and 1763 regularly traded to Chesapeake Bay and in a number of instances were owned, operated, and repaired by Virginia and Maryland merchants, skippers, and shipbuilders.[9] French vessels, some of them noted for speed and sharp lines, were therefore constantly present in the Bay and available for close inspection when careened for breaming, graving, or bottom repairs.

Among those registered in the Chesapeake colonies were the sloop *Elizabeth* (formerly *Spadille*), 70 tons, built in France, captured by H.M.S. *Bellona* on 22 August 1748, and registered at Annapolis in 1748 by Richard Hill and Company of Philadelphia;[10] the ship *Princess Gambia*, 120 tons, in 1760 belonging to Thomas Ringgold and Company of Chestertown; the brig *Pitt*, 25 tons, in 1760 belonging to Daniel Wolstenholme of Annapolis; and the schooner *Dolphin*, 25 tons, in 1759 and the sloop *Henrietta*, 40 tons, in 1760 both belonging to Ringgold and Company.[11]

[8] In 1709 a sloop from the Duchy of Florence was in Maryland and in 1750 some Spanish and Portuguese vessels were driven into the Chesapeake by a storm and had to refit in Virginia. *Calendar of State Papers, Colonial Series, America and West Indies*, 1710-1711, no. 489, pp. 262-263; Public Record Office, C. O. 5: 1327: 227, 251-252. But this was exceptional. Few Mediterranean vessels, xebecs or others, traded to the Chesapeake before the Revolution. During the Revolution, however, a few galleys were built in the Bay, one of them, according to specifications, 'intended to rig after the mediterranean Gallies.' See Order for a Galley to be built, n.d., Virginia State Library. This, of course, was too late to account for the origin of the clipper-schooner.

[9] From the 1690's onwards, French prizes, under British or colonial registry, appear with great regularity in the Chesapeake port books. Examples from the Annapolis Port Book, 1756-1775, Maryland Historical Society:

Ship *Tryton*, 150 tons	registered London,	1757.
Ship *Baltimore*, 170 tons	registered London,	1760.
Ship *Hero* (or *Herod*), 260 tons	registered London,	1758.
Ship *Thetis*, 200 tons	registered London,	1757.
Ship *St. George*, 180 tons	registered London,	1759.
Brig *Success*, 90 tons	registered St. Kitts,	1760.
Brig *Vermudian*, 80 tons	registered Gibraltar,	1760.
Schooner *Hannah*, 20 tons	registered New Providence,	1760.
Schooner *Susannah*, 30 tons	registered New Providence,	1760.
Sloop *Joseph and Robert*, 10 tons	registered New York,	1759.

[10] *Maryland Historical Magazine*, XXVI (1931), 343.

[11] Annapolis Port Book, 1756-1775.

There is unmistakable evidence that some of these French prizes were remarkable for their sharp lines. The schooner *Dolphin* was 'a prime Sailer,' characterized by an 'extraordinary Mould.' The sharp construction that made her fast also cut down her cargo capacity causing her to make two unsuccessful trading voyages. In 1761 Ringgold proposed to his partner, Samuel Galloway of West River, that they use her for smuggling sugar from the West Indies, a branch of trade in which cargo space was readily sacrificed for speed. Ringgold assured Galloway that *Dolphin* would 'soon fly there.'[12] Although this particular vessel may have been too late to influence the development of the clipper-schooner, the fact that French-built vessels were in the Chesapeake throughout the first half of the eighteenth century and occasionally at least had exceptional speed and unusually sharp lines provides the necessary conditions for the operation of French influence.

An even stronger case can be made for the theory of Bermuda influence. In the course of the first half of the eighteenth century Bermuda sloops, famous for their speed and weatherliness, enjoyed great vogue among traders, privateersmen, and pirates. Eventually even the British Navy used them. And before the end of the century they became sufficiently celebrated to have their lines included in Chapman's *Architectura Navalis Mercatoria*.[13] In view of the impressive evidence advanced by Mr. Chapelle in his excellent work, *The Baltimore Clipper*, one can assert with confidence that the Bermuda-built sloops that traded to the Chesapeake unquestionably influenced the progress of ship design in Virginia and Maryland. Speed was important, particularly between 1744 and 1763 when most of the trade carried on by Chesapeake-owned vessels was to the West Indies, an unconvoyed route exposed to attack from enemy warships, privateers, and pirates. As early as 1708 when the French privateer *Crapeau* was lurking off Cape Henry, the Virginia Council impressed a sloop in order to give chase to her. Described as 'a nimble Sloop,' the vessel may well have been a Bermuda-built or a sloop influenced by the lines of a Bermuda sloop.[14]

The speed of Bermuda sloops also made them well suited for pilot

[12] Thomas Ringgold to Samuel Galloway, 23 February 1761, Ringgold Letters, 1760-1770, Galloway Papers, New York Public Library. *Dolphin* was registered at Chestertown in 1759, owned by Thomas and William Ringgold. She made a voyage to St. Kitts and one to Boston in 1759. The next year she was sold to John Tillotson and registered at Patuxent. In 1760 she made a voyage to Philadelphia and one to Barbados, both commercially unsuccessful. After that, Ringgold suggested to Galloway that they buy her back cheap 'under pretence of Rebuilding her for her extraordinary Mould,' and employ her in smuggling.

[13] Fredrik Henrik Chapman, *Architectura Navalis Mercatoria* (Stockholm, 1768); cited in Chapelle, *Baltimore Clipper*, pp. 9-10.

[14] P.R.O., CO 5: 1341, 23.

boats which of course were not concerned with cargo space. Possibly Bermuda-built vessels were used for that purpose in the early part of the century. In time, however, when the schooner rig proved more practicable, vessels were built locally for use as pilot boats. Although they departed from the Bermuda rig and mould, they were undoubtedly influenced by them. In 1737 the *Virginia Gazette* carried an advertisement for a lost or stolen 'Pilot-Boat, with Two Masts, Twenty Four Foot Keel, Nine Foot Beam.'[15] As she had no cargo to carry, she very likely had clean underwater lines, great dead-rise, and hollow quarters.

Bermuda sloops were a familiar sight in Chesapeake Bay long before the middle of the eighteenth century. Of the thirty-eight sloops mentioned in the *Virgina Gazette* as having entered or cleared between 3 September and 31 December 1737, no fewer than twenty-five were from Bermuda.[16] In May 1745 the colonial authorities of Virginia, in order to provide the Bay with a 'Guard la Coast,' hired 'a fine Sloop, belonging to Col. Mackenzie, Bermuda-built, and a good Sailer.'[17] In 1747 Colonel Fairfax loaded a 'Bermudas Sloop' for a voyage to Barbados.[18] In 1762 John Williamson, a ship carpenter in Norfolk, repaired a 'Bermuda Sloop' for Neil Jamieson.[19] The following year Thomas Ringgold wrote from Chestertown that 'a Bermudian' was selling salt for corn in Wye River, Maryland, and added that 'we have a Bermudian here' doing likewise.[20]

Because Bermuda sloops frequently traded to the Chesapeake and were repaired and owned here for more than half a century before the Revolution, conditions were favorable for Chesapeake shipbuilders to observe and copy their lines. Positive proof that this was done is afforded by an advertisement, discovered by Mr. Chapelle in the *Maryland Gazette* for 1761, offering for sale the hull of a vessel on the stocks, 'built . . . very much after the Bermudas mould.'[21] The mention of 'mould' makes it clear that design and not method of construction is referred to. The

[15] *Virginia Gazette*, 15 July 1737.

[16] For earlier shipping relations between Virginia and Bermuda, see J. H. LeFroy, ed., *Memorials of the Discovery and Early Settlement of the Bermudas or Somers Islands 1515-1685* (London, 1877), I, Appendix V, 721-742.

[17] *Virginia Gazette*, 23 May 1745.

[18] Richard Bland Lee Papers, no. 367, Library of Congress.

[19] Jamieson Papers, VI, no. 1209, Library of Congress. The bill included the item, 'To 13 lbs Spikes for a Keel . . . For a Bermuda Sloop.' Since the other items are for repairs, not building, the probability is that Williamson repaired a Bermuda sloop then in Virginia waters, consigned to Jamieson. As she would have to be hove down in order to receive a new keel, her underwater lines could have been carefully studied.

[20] Thomas Ringgold to Samuel Galloway, 10 July 1763, Ringgold Letters, 1760-1770, Galloway Papers, New York Public Library.

[21] *Maryland Gazette*, 27 August 1761; *The Mariner* (1933-1934), p. 109; Chapelle, *History of American Sailing Ships* (New York, 1935), p. 82.

next year Benjamin Mifflin, visiting Annapolis, saw a sloop, brigantine, and ship under construction 'by a Bermudian.'[22]

Thus the stage was set for the evolution of the clipper-schooner with both French and Bermuda vessels much in evidence. For typological reasons it may be that the case for Bermuda influence is stronger. Historically, there is no denying that both influences were present. Possibly the clipper-schooner emerged under the combined influence of sharp-hulled French prizes and raking Bermuda sloops. Whatever the proportions of the two influences, fast-sailing vessels began to be built in the Chesapeake for use as privateers during the French and Indian War.

As early as 1755 Charles Carroll the barrister built vessels for the British market, one of which, the ship *Mermaid,* was 'reputed an extreme well built fine moulded vessel.' In describing her to a London merchant, Carroll said 'Ships of her Build and Size are much wanted either for privateers or Store Ships,' and boasted that 'it will be both unjust and ungenerous to Rank her with the common rate of American or New England Sale Built Vessels.'[23] Obviously, if Carroll was not exaggerating, *Mermaid* was something out of the ordinary—possibly influenced by the evolving clipper-schooner's lines.

Another interesting example of sharp construction was the ship *Hero.* During the French and Indian War she operated as a privateer out of Norfolk, owned by Benjamin Tatem and skippered by Hugh Sprowle.[24] After the war the sharp lines that made her an excellent privateer proved a hindrance in the leisurely pursuits of peacetime commerce. Sent to the Clyde to be sold, she was appraised by three captains and builders who gave opinion that she was not worth above £450, but added that 'she might bring much more at a French Market she being so sharp in the bottom she will be always an unprofitable Ship in this River.'[25] Sent to Bordeaux, *Hero* failed to find a purchaser. Possibly she was too extreme even for the French![26]

[22] Victor Hugo Paltsits, ed., *Journal of Benjamin Mifflin; the Record of a Tour from Philadelphia to Delaware and Maryland, July 26 to August 14, 1762* in New York Public Library, *Bulletin* XXXIX (1935), 12.

[23] *Maryland Historical Magazine,* XXXI (1936), 307-309.

[24] Jamieson Papers, II, no. 430. It is assumed that this ship was built in the Chesapeake. There is a chance, however, that she was the French prize ship *Hero* (or *Herod*), 260 tons, that was registered in London in 1758 and is known to have been in the Chesapeake that year. See footnote 9.

[25] Jamieson Papers, III, no. 638.

[26] Ibid., IV, no. 888. Since no purchaser was found at Bordeaux, *Hero* was dispatched to St. Martin to load salt, thence to Lewes, Delaware. In 1765 she was employed in the West India trade. Ibid., V, no. 116.

Notes

Bright Light on *Flying Cloud* vs. *Andrew Jackson*

In pursuing further the *Flying Cloud-Andrew Jackson* controversy, my interest is not so much to determine which ship made the faster voyage to San Francisco, or to the pilot ground off San Francisco (although as a San Franciscan I am of course anxious to put the final polish on one facet of her fascinating maritime history), as to settle the question of whether the government records and commercial intelligence that maritime historians have depended on as their ultimate source material can be brushed lightly aside as contradictory and 'hearsay.'

Mr. Cutler's criticism of log entries that attribute all happenings to the even hour is obviously justified, yet I do not believe that it can be used to prove that there is an inherent error greater than sixty minutes in an entry. Very good track of time is kept aboard a ship; the bell is struck, the wheel relieved, and the watches changed at short and regular intervals; any occurrence can be timed within an hour simply by inquiring who was at the helm at the time.

Particular reliance can be placed on the entries that concern the navigational position of the ship. Thus, the departure taken by *Flying Cloud* off New York Lightship at 6:00 P.M. of 21 January would have been carefully recorded on the navigator's slate. This is a basic requirement for keeping the dead reckoning on a voyage, and no amount of sailing day confusion would be permitted to interfere with it. Likewise the log entry that at 12:00 on 20 April she was in 37° 18′ N, 123° 54′ W, means that at exactly noon (local apparent time, which was used as ship's time for the rest of the day) she was in exactly that position, as nearly as it could be given by Captain Cressy's instruments. I have laid down this position on the accompanying chart, marking it 12:00 for ship's time and 88-18 for the days and hours elapsed (by ship's time) since the departure from the lightship and pilot ground. Captain Cressy computed his day's run to this point as 185 miles, giving an average speed of 7¾ knots, with a light breeze from the southwest.

There is no other navigational information for the rest of the run in *Flying Cloud's* abstract log, but there is the *Alta's* definite statement that she anchored at 8 P.M., and the *Herald* adds the information that she anchored off Goat Island (now called Yerba Buena or Treasure Island). Mr. Cutler for some reason questions the reliability of the *Alta's* report, but I think he has overlooked the obvious fact that the appearance in the Friday morning papers of not only the report of the *Cloud's* arrival, but also her captain's memorandum, a passenger list, a list of other ships spoken on the voyage, and a complete cargo manifest, is in itself positive proof that her anchor was let go early in the evening, well before press time. Nowadays a ship arriving at San Francisco after 6 P.M. Thursday does not have her arrival recorded in the morning papers until Saturday: this when reporters have telephones available and are not obliged to go about the harbor in a Whitehall boat boarding ships to collect information.

I have therefore marked *Flying Cloud's* anchorage with an anchor and the time, and have indicated by a dashed line her probable course from noon, across the bar, to her anchorage. This distance scales just 80 miles, which was covered in an elapsed time of 8 hours, giving a speed of advance of 10 knots; not bad, considering that she stopped for a pilot on the way. The intervening distance has been marked off in hourly (10-mile) intervals, with the time of day, and elapsed days and hours from the Sandy

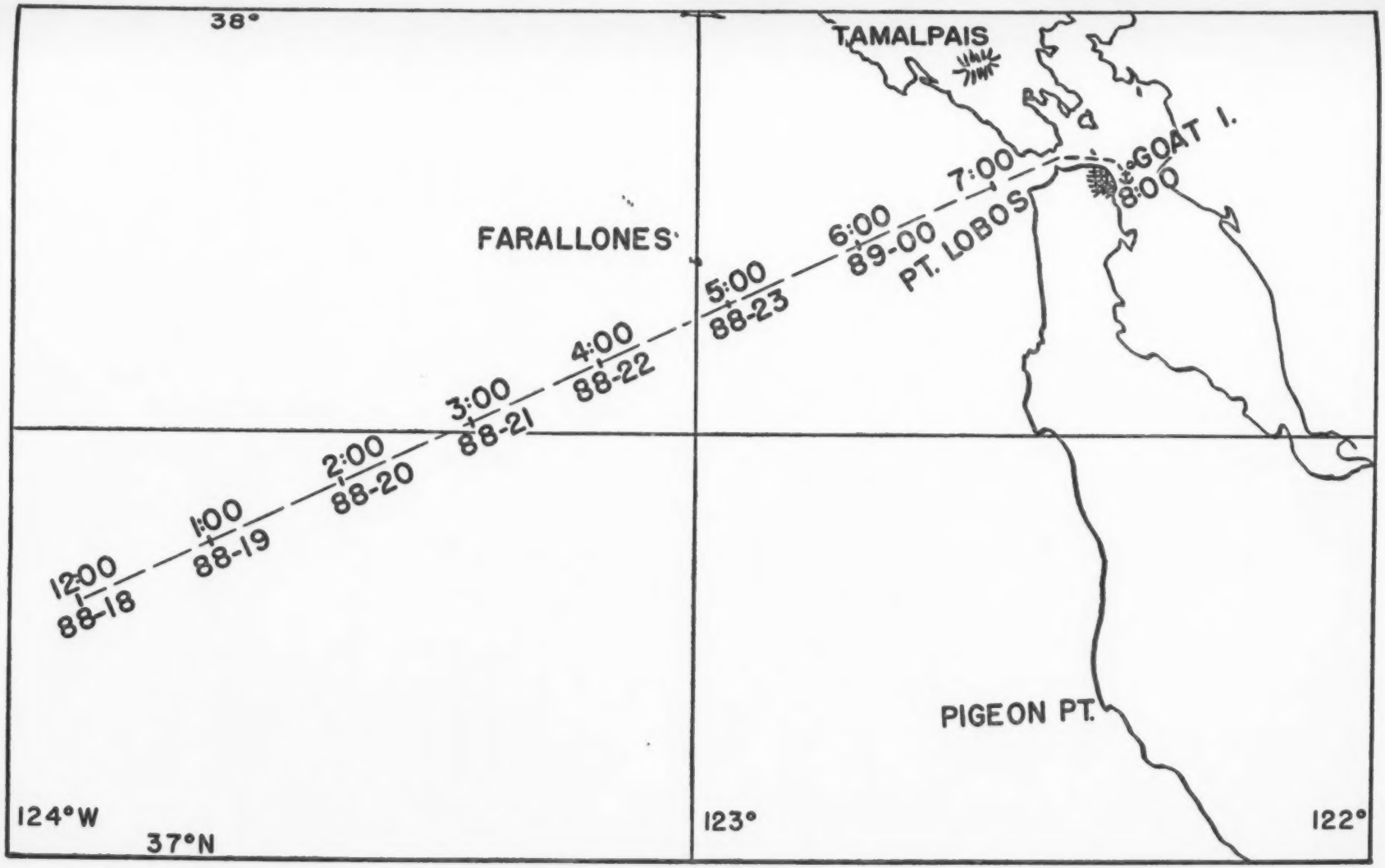


Chart of San Francisco Bay and the Gulf of the Farallones, showing *Flying Cloud's* probable track from her noon fix on 20 April 1854 to her anchorage off Goat Island at 8:00 P.M. that evening. Scale, one degree of latitude equals 60 miles.

Hook pilot ground, at each. I do not claim that *Flying Cloud* passed through each of these points at the exact time shown, but instead leave each reader to estimate for himself the possible margin of error and the probable time of arrival at the San Francisco pilot ground.

It is worth pointing out how the log entry 'At 1:00 P.M. made the Farallones.' is verified. Coming in from the southwest a ship actually first sights Mount Tamalpais (2400 feet) in range with Southeast Farallon about 38 miles outside the island, which is visible less than 25 miles from a ship's deck. A 38-mile circle from Southeast Farallon cuts *Flying Cloud's* course almost exactly at the indicated 1:00 P.M. position.

There is no disagreement between *Alta's* weather report for the afternoon of Thursday, 20 April, and the weather recorded in *Flying Cloud's* abstract log, since there are no weather entries covering this time in the log. The light breezes Mr. Cutler refers to describe conditions of the sea day of 20 April, which began at noon Wednesday and ended at noon Thursday.[1] An idea of the weather outside near San Francisco that afternoon can be gleaned from the marine report that the steamer *Major Tompkins,* which sailed on Thursday for Santa Cruz, met with a heavy southerly gale off Pigeon Point and attempted to return to San Francisco, but found the bar breaking so heavily that she had to lie outside until Friday. Under conditions like these would a pilot boat run 'far out to meet her as she slowly drifted in'?

The agreement between the weather reports of the *Herald* and the *California Chronicle* is not surprising, since both obtained their marine news from Robert S. Martin, who operated from a small boat in San Francisco Bay, whereas the *Alta* had exclusive rights to the Merchants' Exchange reports, which included the marine telegraph strung across the sandhills from Point Lobos. Martin's report that the wind at sunset was southeasterly with flood tide therefore does not contradict the Point Lobos report, since Martin had no means of ascertaining wind direction off the Heads. Likewise his apparent neglect to mention *Flying Cloud* inbound at sundown is obvious: he boarded her a couple of hours later off Goat Island and had no need to report her previous location. The Point Lobos telegraph operator, on the other hand, reported what he saw, as he was paid to by the Merchants' Exchange; his report is not hearsay, but rather an entry made in the ordinary course of business. JOHN LYMAN

[1] Similarly the 'baffling rain squalls' suggested by Mr. Cutler as explaining *Andrew Jackson's* invisibility on the afternoon of Friday, 23 March 1860, are recorded in the log as occurring on the first part of 23 March, sea date, which is Thursday afternoon, civil date.

BARK *Vernon*

IN the 'review' of the collotype reproduction published by the Old Print Shop of the William Bygrave painting showing the bark *Vernon* leaving Messina Harbor (THE AMERICAN NEPTUNE, VII [1947], 249), regret was expressed that the printed caption was not in better keeping with the subject. It now seems desirable to cut the caption off entirely, for subsequent research has disclosed the probability that the 1839 Medford-built bark is not the vessel shown at all. This *Vernon* was only 107 feet in length. Obviously a larger vessel is depicted, possibly the 446-ton bark *Vernon* built in New York in 1843. Mr. Harry Shaw Newman had admitted the probability of error, stating that he had nothing to go on except what showed on the face of his painting. Likewise his assumption [Old Print Shop *Portfolio,* VI (1947), 144] that the painting was made in the 'forties might be rejected on the basis of its extraordinary similarity to another Bygrave painting, now in The Mariners' Museum, showing the bark *Zephyr* and dated 1860. ALEXANDER CROSBY BROWN

Book Reviews

WILLIAM HUTCHINSON ROWE, *The Maritime History of Maine* (New York: W. W. Norton & Company, Inc., 1948). 6″ x 9¼″, cloth. 333 pages, 29 illustrations, 5 facsimile documents, 2 sets of lines and sail plan, end-paper map. $6.00.

There has long been a genuine need for a history of maritime Maine. Throughout three centuries her name has been synonymous with outstanding and varied endeavor on the high seas. Much of her great story is familiar, thanks to the extensive nautical literature which she has inspired, but all previous studies have been narrowed in scope to the shipping of a limited area of coast, to the experiences of a single mariner, or to the discussion of a single class of vessel or trade. It is a worth-while task, indeed, which Mr. Rowe has undertaken in marshaling this scattered lore into some semblance of perspective. Within the excessively constrained bounds of three hundred pages he has completed his work with a measure of sober success.

It was the winter cod fisheries, the author points out, which first lured Englishmen to Maine shores. The records of the early seventeenth-century fishing settlements at the Isles of Shoals, Richmond's Island, and Monhegan are fragmentary but they enable us to catch a fascinating glimpse of honest pioneer toil often enlivened by Indian hostility. The markets for the highest grade of cured fish were in Spain and the Mediterranean while the cheaper 'refuse fish' found a ready market as a food staple for the slaves on the West Indian sugar plantations. The need for vessels in the fisheries and in these export trades fostered the first efforts at American shipbuilding.

The Maine coast has never been a good farming country, but forests, bountifully stocked with tall white pine, once extended far up the river valleys of the Piscataqua and the Kennebec, the Penobscot and the Union, the Machias and the St. Croix. During colonial times from the westernmost of these streams and from the heavily-wooded shores of Casco Bay came excellent mast timber which proved no small factor in keeping the balance of sea power weighted in Britain's favor. The avaricious 'broad arrow' policy of the Admiralty which reserved the choicest of this timber for naval use was a sore point with the colonists and remained a factor in the enthusiasm with which Maine privateers attacked British commerce in the struggles for independence.

Between the stirring war years of the Revolution and 1812 Maine shared something of the shipping prosperity born of a precarious American neutrality. It is interesting to learn of Portland collaboration with Salem in the East India trade as early as 1796, and it is somewhat of a revelation also to find that the great Salem merchant, William Gray, had twenty-seven of his vessels built in Maine yards.

From the peace in 1783 until the Civil War untold millions of feet of lumber were shipped foreign and coastwise in Maine-built ships. Bangor supplanted Wis-

casset in the volume of these timber shipments and went on to become the greatest lumber port in the world until the depletion of the forests brought the trade to an end. Readers of the NEPTUNE are already familiar with Mr. Rowe's pleasant chapter on the West India trade in which vast numbers of small brigs and craft of kindred rig were employed to carry pine plank, shooks, and sugar boxes to the Caribbean, whence they returned with rum, molasses and sugar for the Portland refineries and distilleries.

Always closely allied with lumbering was the development of shipbuilding. Mr. Rowe devotes considerable attention to the practices of wooden ship construction, but following these informative generalities he catalogues shipbuilding communities and builders in a manner which makes for dull reading unrelieved by the saving grace of authoritative completeness. Of greater importance, perhaps, than the West India trade was the cotton trade from New Orleans to Liverpool. The fortunes of the foremost Bath shipping families, the Sewalls, the Pattens, and the Houghtons, were firmly established by the large, full-ended, 'kettle-bottomed' cotton carriers which they built between 1830 and 1860. During the 1850's Maine also turned out more swift-sailing clippers than is generally realized. *Red Jacket* is well remembered, but this book details over eighty other fine-lined Maine vessels of that golden decade.

The Civil War was a difficult period for maritime Maine. The opening of hostilities brought an end, of course, to the cotton trade, and broke the warm personal ties which had linked Bath shipowners, shipbuilders and shipmasters with New Orleans ship brokers and cotton merchants. At sea, Confederate commerce raiders took a toll of eighty-eight Maine vessels. In both a chapter and an extremely useful appendix the author gives adequate treatment of this unfortunate episode.

In the last thirty years of the nineteenth century, when the rest of New England turned its back on the sea to engage in more profitable industrial pursuits, Maine was too far removed from the nation's markets to compete extensively in manufacturing. Indeed she clung to maritime enterprise and the skill of her shipbuilders and seamen gave her leadership in the American merchant marine as long as wooden ships could be built and operated with profit.

When the magnificent square-rigged 'Down Easters' were driven from the Cape Horn trades about 1890 the great schooners were in their heyday in the coasting trades, and for another twenty years the shipyards of Bath and Thomaston, Rockland and Camden continued to launch a goodly tonnage of fore-and-afters. The author devotes a chapter to these big schooners, which, although far from exhaustive, has considerable merit as one of the first studies of the interesting but little-known vessels. He touches briefly also on the later developments of the fisheries and on the ice, stone and lime trades which have received little or no attention from marine historians. It is to be hoped that Mr. Rowe's introduction to these subjects will stimulate more exhaustive investigation. A thoroughly delightful final chapter provides a keen sociological analysis of the impact of the old maritime economy upon a typical Maine seacoast town. One need only point out, as the writer does, that as late as 1860 almost one fifth of Maine's population consisted of mariners, a goodly percentage of them captains, to appreciate how greatly the state was dependent upon the sea.

Satisfactory as the outline of the book is in general, it is sincerely regretted that all mention of steam navigation and the building of steamships has been omitted. Until very recent years a host of small steamers, many of them locally built, served nearly every Maine coast and river town. They were homely and intimate little craft, fully as genuine a part of the coastal scene as they plied their way among the tide-swept ledges and headlands crowned with pointed firs as were the lime coasters and pinkys. These steam boats are gone and large wooden ships are no longer built, but, thanks to the Bath Iron Works, Maine still enjoys an enviable reputation as a shipbuilding state. This yard has turned out dozens of destroyers which are a byword of excellence in the Navy. Its yachts, such as *Vanda, Hi-Esmaro,* and the last of the *Corsairs* were world renowned for their luxury and fineness of finish. A large number of sturdy Boston trawlers are products of this Kennebec establishment, as are some of the finest cargo liners in the Mediterranean service of the American Export Line. It would seem, also, that the mighty fleet of lease-lend freighters and Liberty ships built in South Portland during World War II are deserving of at least a paragraph.

It is likewise unfortunate that a number of minor errors were allowed to pass undetected before the book was published; for instance, on page 210, the Phippsburg ship *St. Charles* is meaninglessly described as a 'fine topgallant-yarder.' A painting of this vessel shows her to have been a *five* topgallant-yarder. Again, if the ship *Edward Sewall,* as stated on page 217, covered 23,407 miles in her sixty-seven day ordeal rounding Cape Horn she would have had to average the astounding figure of 349 miles per day. Certainly this distance was the total for the entire voyage from Philadelphia to destination. Although *Aryan* was the last wooden full-rigger built in the United States, she was not, as stated on page 234, 'the final word' in American square-riggers.On an earlier page a later vessel, the well-known *Dirigo,* is mentioned, and she was followed by eight more square-riggers of steel from the Sewall yard in Bath, the last of which, *Atlas,* towed down the Kennebec a full nine years after *Aryan.* Nor again is it possible to agree that the Alaska Packer's fleet consisted 'to the last . . . almost entirely of old down-easters.' The third appendix which shows the tonnage owned in the several Maine customs districts should be used with caution. It contains an error of 5000 tons in the 1830 total, and the 1840 figures credit Portland with more shipping than was owned in the entire state. Unfortunately it would be possible to lengthen this recital of minor errors, oversights and typographical discrepancies to a considerable extent.

The Maritime History of Maine is attractively printed. The end-paper maps are handy although greater detail would have enhanced their usefulness. The choice of illustrations is exceptionally good, but, judging from the quality of some of the original contact prints which are commonly available, it might have been expected that the reproductions would be of a higher quality. Despite all its shortcomings, however, this book does stand as a worthy contribution to nautical literature. It is doubted that it will be the definitive maritime history of Maine, but it will likely be many years before anyone surpasses Mr. Rowe's effort.

HUGH CARRINGTON, Editor, *The Discovery of Tahiti. A Journal of the Second Voyage of H.M.S.* Dolphin *Round the World Under the Command of Captain Wallis, R.N., in the Years 1766, 1767 and 1768. Written by her Master George Robertson* (London: Hakluyt Society, 1948). 5¾″ x 8¾″, cloth. lii+292 pages, 6 plates, 4 maps. Issued to members of the Hakluyt Society for 1948.

The general excellence of the Hakluyt Society's distinguished series of blue bound volumes is so well established that no comment on it is required. The appearance of each new volume is an event to be looked forward to impatiently.

George Robertson was the master of H.M.S. *Dolphin* under Captain Samuel Wallis on his voyage of discovery. He was obviously an able and efficient sailor and also, as this journal reveals, a man of great observation and considerable intellectual curiosity. The journal begins on 24 June 1766 when *Dolphin* was lying at Deptford Dock undergoing thorough repair. Robertson's account supplies many amplifying details of events mentioned in the Wallis journal as published by Hawksworth, and recounts some happenings not referred to by Wallis at all. No doubt part of the reason for this was the incapacitating illness of Wallis during a large part of the voyage, particularly during that important period when *Dolphin* was lying at Matavie Bay. However it was, Robertson adds considerable new ethnological information to our knowledge of Tahitian culture at the time of white discovery and his particulars of the relationship between the natives and ship's men is probably the best such account yet published. The last entry in the journal was made on 17 August 1767 when the ship left Uea or Wallis Island.

The Introduction and editorial comments are at the usual high standard of a Hakluyt book. It is unfortunate that Hugh Carrington did not live to see his scholarly efforts in print. The book is further amplified by nine appendices which provide relevant information on anchors, rigging, Dr. Knight's compass, Anson's voyage, the Falkland Islands, Carteret and H.M.S. *Swallow*, Davis Land, the Polynesian Islands, and the introduction of venereal disease into Tahiti. Appendix B, *The Rigging*, wherein an effort is made to reduce this complicated subject to words of one syllable familiar to landsmen, is the least satisfactory part of the book. One supposes such explanations are necessary but it certainly sends shivers down the spine of a coastal New Englander to read 'the top of the mast next in front' and similar phrases. It is a good illustration of how far we have come from the days of sailing ships when nautical terms and sea language were generally understood and needed no explanation.

Sea Breezes, The Shiplovers' Digest, American Edition, Volume VII (new series), No. 1, January 1949. 4¾″ x 7¼″. 64 pages. Published by Charles Birchall & Sons, Ltd., 17 James Street, Liverpool 2, England. $3.00 per year.

Sea Breezes was established in December 1919 as the house organ of the Pacific Steam Navigation Company of Liverpool, under the editorship of T. E. Edwards, who served until August 1924. Edwards was too much of an individualist to restrict the pages of the magazine to the affairs of a steamship line, and, instead, began to publish reminiscences of tea clipper captains. Subsequent editors, sail-trained P.S.N.C. captains, confirmed and extended this policy until by 1930 the magazine had

become a clearing house for information of the surviving sailing ships, as well as the foremost source in the English language of firsthand accounts of experiences in such vessels.

In 1937 the P.S.N. Co. turned *Sea Breezes* over to Charles Birchall & Sons, proprietors of the Liverpool *Journal of Commerce*. Publication was suspended with the October 1939 issue, leaving Volume 23 uncompleted, but the spark was kept lighted by a weekly 'Sea Breezes' page in the *Journal of Commerce*.

Volume I, number 1, of the new series of *Sea Breezes* appeared in January 1948, under a new editorial policy which envisioned it as a monthly digest devoted more to the affairs of contemporary steamers than to accounts of sailing vessels of the recent past. In particular, a long feature article in each issue has given the history of an existing British steamship company and its vessels.

That such a change would not be agreeable to a portion of the readership was, of course, to be expected. Strangely enough, the most vociferous protests seem to have come from America. As a result, the first number of the American edition of *Sea Breezes* was issued in January 1949. In it the long steamship feature has been omitted in favor of sailing ship material, slanted particularly toward the American reader. It is indicated that the edition will be circulated for an experimental period of one year, after which its continuation will depend on the reception it is given.

Nautical Research Journal, Volume I, No. 1, January 1949. 8½″ x 11″ (stencilled). 10 pages. Published quarterly by the Nautical Research Guild (Harry D. Hamilton, secretary-treasurer, 15004 E. Granada Avenue, Whittier, California).

The Nautical Research Guild is an organization founded in 1948 by a group of men interested in ship models, for the purpose of pooling their reference sources and research facilities. During 1948 a *Secretary's Monthly Letter* was issued, which is to be continued and embodied in the quarterly issues of the *Journal*.

The first issue of the *Nautical Research Journal* contains an article on the Marine Section of the Franklin Institute in Philadelphia, a brief account of privateers in the War of 1812, a letter from Bill Adams, notes from a ship modeler, and similar items.

Great Britain, Hydrographic Department, *The Antarctic Pilot; comprising the coasts of Antarctica and all islands southward of the usual route of vessels* (London: Hydrographic Department, Admiralty, second edition, 1948). 6″ x 9½″, linen. xlii+370 pages, 100 illustrations. 12*s*. 6*d*.

The new edition of the British Admiralty sailing directions for the Antarctic includes the results of surveys as recent as the U. S. Navy 'Highjump' operation of 1946-1947. A useful feature is the inclusion on pages 6 to 25 of a chronological list of Antarctic expeditions from 1502 to 1948, with brief notes on each. In view of the controversy in recent years over priority of discovery of the Antarctic mainland, the categorical statement on page 8 that Edward Bransfield was 'the first man to discover and chart a portion of the Antarctic mainland' is of interest.

J. G. CROWTHER and R. WHIDDINGTON, *Science at War* (New York: Philosophical Library, 1948). 5½" x 8¾", cloth. 185 pages + index, 51 figures, 51 plates. $6.00.

'Science and the Sea,' the fourth part of this book, will have greatest appeal to readers of THE AMERICAN NEPTUNE, the other three parts being 'Radar,' 'Operational Research,' and 'The Atomic Bomb.'

Science at War is the official British narrative of their scientists' contribution toward victory in World War II. It explains in very simple and clear language the functioning of a great many hitherto 'secret' weapons, and outlines the steps that led to their development, or to the development of countermeasures. Reference to it will make more understandable such war narratives as *Destroyer from America* and *East Coast Corvette,* which had to be censored severely in technical details.

MINISTÈRE DES TRAVAUX PUBLICS ET DES TRANSPORTS, *Annales Techniques de la Marine Marchande,* No. 12, pages 161-312, February 1948. 150 francs.

This special number, dedicated to reconstruction of the French merchant marine and fishing fleet, lists French war losses without giving exact dates or causes of loss. Also included are lists of ships scuttled by the Germans and later salvaged, former German ships transferred as reparations, and other postwar additions to the French merchant marine.